

DOE/EIS-0108
Volume 3 of 3

**FINAL
ENVIRONMENTAL IMPACT STATEMENT**

**L-Reactor Operation
Savannah River Plant**

Aiken, S.C.

Volume 3



May 1984

U.S. Department of Energy

APPENDIX M

COMMENTS AND DOE RESPONSES ON DRAFT ENVIRONMENTAL IMPACT STATEMENT L-REACTOR OPERATION

During the 45-day public comment period from October 1 through November 14, 1983, the U.S. Department of Energy (DOE) received 140 comment letters and statements on the draft version of this environmental impact statement (EIS). In addition, four comment letters were received after November 14, 1983. Of the total of 144 letters and statements, 7 were from Federal agencies and 7 were from agencies and offices of the States of Georgia and South Carolina. Forty-eight statements were presented at public meetings conducted by DOE at Augusta and Savannah, Georgia, and at Aiken and Beaufort, South Carolina, during the week of October 31, 1983. DOE has prepared a public comment/hearing report (DOE /SR - 5009) that includes transcripts of these public meetings, written statements received at the meetings, and all comment letters received by DOE through the mail. This report has been placed in the DOE public documents rooms in Washington, D.C., and Aiken, South Carolina, and 19 local libraries in South Carolina and Georgia.

This appendix presents the individual comment letters and statements and DOE's responses to them. If a comment or statement has led to a revision to the text of this EIS, the revision is identified by a vertical line in the margin and a comment letter-number designation. Table M-1 lists the comments received, and Table M-2 lists the individual comments and DOE responses.

The comments and statements reflected a number of specific and general issues. The following synopsis summarizes the major issues listed in alphabetical order and DOE's responses.

COOLING-WATER ALTERNATIVES

Comments

One of the most commented-on aspects of the Draft EIS concerned the discussion of cooling-water alternatives, and in particular the Department of Energy's identification of restarting L-Reactor with direct discharge and subsequent mitigation as its preferred alternative. Major categories of comments included:

- Cooling-water alternatives were not seriously considered.
- Mitigation of L-Reactor thermal discharge should be taken prior to L-Reactor restart.
- Direct discharge of cooling-water would violate the State of South Carolina's water quality standards.
- Several of the cooling-water alternatives to direct discharge would also violate state water quality standards.

- The Draft EIS failed to identify the specific cooling-water mitigation measures that would be taken.
- Recirculating cooling-towers are environmentally preferable.

In general, almost all of the comments received on the subject of cooling-water alternatives expressed a desire to see the Department of Energy implement a cooling-water alternative prior to the restart of L-Reactor that would meet the State of South Carolina's water quality standards.

Federal and state agencies commenting on the Draft EIS's discussion of cooling-water alternatives included the U.S. Environmental Protection Agency, the U.S. Department of the Interior, the South Carolina Department of Health and Environmental Control, the South Carolina Water Resources Commission, and the South Carolina Wildlife and Marine Resources Division. These agencies indicated that the restart of L-Reactor with direct discharge would violate existing Federal and state water quality regulations, would reverse the successional recovery of the Steel Creek ecosystem, would result in unsatisfactory and significant effects on ecological resources, and the impacts of direct discharge could be alleviated through the implementation of alternative cooling-water systems. The Environmental Protection Agency rated the Draft EIS as being environmentally unsatisfactory ". . . on the basis of outstanding water quality issues." The Environmental Protection Agency further stated that the Draft EIS ". . . does not provide sufficient information regarding the corrective measures that will be employed to avoid adverse environmental impacts." The U.S. Department of the Interior stated: "If DOE neither selects mechanical draft cooling towers nor develops a plan to adequately mitigate for impacts to fish and wildlife resources, then the Department of the Interior may choose to refer this project to the Council on Environmental Quality pursuant to 40 CFR 1504."

Response

Based on the Department of Energy's review and evaluation of the comments received, several modifications to the Draft EIS's discussion of cooling alternatives and the Department's preferred alternative have been made in this Final EIS.

Section 4.4.2 of this Final EIS has been modified to provide a detailed discussion of additional combinations of various cooling-water systems. Specifically, Section 4.4.2 now provides an evaluation of thirty-three cooling-water systems, including a discussion of each system's capability to attain the water quality standards of the State of South Carolina. Appendix I of this Final EIS has also been modified to evaluate the potential wetland losses associated with each of cooling-water systems discussed in the revised Section 4.4.2.

The cooling-water systems considered in Section 4.4.2 can be grouped into five major categories--once through cooling lake, recirculating cooling lake, once-through cooling tower, recirculating cooling tower, and direct discharge. Based on this categorization, a new section (Section 4.4.2.6) has been added to this Final EIS that summarizes and compares the engineering and environmental evaluations for the most favorable alternatives for each of these categories of cooling-water systems. The criteria used in selecting the most favorable alternative for each of the categories considered included: ability to meet

South Carolina water quality standards, production considerations, schedule, environmental factors, and cost. The ability to expedite the schedule of implementing the alternatives was also considered as well as the degree that reactor operation would have to be modified to attain water quality standards.

After considering all factors, the Department has identified a once-through 1000-acre lake prior to the restart of L-Reactor as its preferred cooling-water alternative. Although cooling towers would cause fewer environmental impacts, the once-through 1000-acre lake was identified as the preferred system because it would:

- Meet all State and Federal regulatory and environmental requirements, eliminating thermal impacts on the river, swamp, and unimpounded stream while providing a productive balanced biological community in the lake.
- Provide the earliest reactor startup and the maximum plutonium deliveries of any environmentally acceptable cooling-water system that can meet regulatory requirements.
- Have the lowest costs of any environmentally acceptable cooling-water system that can meet regulatory requirements.
- Be amenable to backfitting with precooler systems, if needed, which could improve reactor operational flexibility and production capability.

Based on the identification of implementing a 1000-acre lake prior to L-Reactor restart as the preferred cooling-water system, the Department has modified Section 2.4 of this Final EIS to provide a summary comparison of the most favorable cooling-water system alternatives and a summary comparison of the impacts of the preferred alternative--to restart L-Reactor as soon as practicable after the construction of the 1000-acre lake--and the no-action alternative. Also, the Department has added a new section and appendix--Section 4.5 and Appendix L--to this Final EIS to specifically discuss the environmental consequences of the preferred alternative.

EMERGENCY PLANNING

Comments

Emergency planning comments received during the Draft EIS review period tended to be general in nature, focusing on the ability or inability of local emergency response capability. A few of the more specific comments included:

- The adequacy of a 50-mile ingestion pathway Emergency Planning Zone (EPZ) was questioned.
- There has been a lack of emergency planning by counties surrounding the SRP.
- Accidents used for emergency planning might not be severe enough.

DOE responses

DOE has expanded the EIS, in Appendix H, to include areas served by water systems in Beaufort and Jasper Counties and the Port Wentworth and Savannah areas for the ingestion pathway. These areas will be included in planning for responses to releases of radionuclides that could enter the food or water ingestion pathway to humans.

DOE has signed formal memoranda of understanding (MOUs) with the States of South Carolina and Georgia to provide staff assistance in the preparation of offsite emergency plans for SRP incidents. This planning includes state and county-level responses, training, public education, and coordination activities. The MOUs include agreements with hospitals to accept contaminated patients and processes and procedures for the distribution of information and the notification of responsible agencies and the public. DOE will conduct exercises of these plans to assure appropriate actions and coordination of responses. Separate plans are in place to respond to terrorist attacks or military acts onsite. If such an act resulted in a release of radioactive material offsite, the state and county plans for SRP emergencies would be implemented and other Federal agency support would be activated.

DOE has applied the planning basis and emergency operating procedures for SRP accidents to areas outside the EPZ but within 10 miles of the reactors (the Contingency Planning Zone); they can be extended to more distant areas if necessary.

ENDANGERED SPECIES AND WILDLIFE

Comments

A number of general and specific concerns regarding the L-Reactor restart impacts on endangered species and their habitats were raised during the review of the Draft EIS. Most of these concerns dealt with the impacts from the direct discharge of cooling water to Steel Creek. Specific questions and concerns were raised with respect to the wood stork. Other general categories of comments and concerns included:

- Results of consultations with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service regarding potential impacts on and mitigation measures for endangered species should be presented.
- Radioactive substances released to the environment are incorporated and frequently concentrated in tissues of many organisms. The effects of this radiation are not addressed adequately.
- The effects of chemicals discharged into creeks on the SRP and the Savannah River might be harmful to fishes and wildlife.

DOE responses

In this Final EIS, the Department of Energy has identified its preferred cooling-water alternative as the construction of a 1000-acre lake before

L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in about 50 percent of the lake.

On February 25, 1983, the FWS issued a Biological Opinion on the American alligator (Alligator mississippiensis), which stated that the operation of L-Reactor as proposed (direct discharge of cooling water) would not jeopardize the continued existence of this species. Since the issuance of this opinion, the Department of Energy has identified the discharge of cooling water to a 1000-acre cooling lake as its preferred cooling-water system for L-Reactor. An updated biological assessment that includes the Department's preferred cooling-water system was transmitted to the FWS at the end of March 1984. Currently, the Department is awaiting the review of this updated assessment by the FWS. The Department anticipates that the FWS review will not alter the prior opinion that the operation of L-Reactor would not jeopardize the continued existence of this species.

Listing of the wood stork (Mycteria americana) as an endangered species occurred February 28, 1984, after the Draft EIS for L-Reactor was completed. Beginning in April 1983, studies on the wood stork were initiated. The design of the woodstork study program and preliminary results of the program were provided to the FWS during an informal consultation process. Data from the wood stork program has been included in this Final EIS. A biological assessment for the wood stork was formally transmitted to the FWS at the end of March 1984. The Department is currently awaiting the review of this assessment by the FWS. The Department anticipates that as a result of the FWS review, the FWS will concur in the Department's conclusion that while the operation of L-Reactor might affect portions of the wood stork's SRP foraging habitat, operation of L-Reactor and other ongoing and planned operations will not affect the continued existence of this species.

A Biological Assessment of the impacts of present and proposed operations at the Savannah River Plant (SRP) on the shortnose sturgeon (Acipenser brevirostrum) was provided to the National Marine Fisheries Service (NMFS) in 1983. Following review of the assessment, NMFS issued on November 1, 1983, their Biological Opinion that the population of the shortnose sturgeon in the Savannah River would not be adversely affected by ongoing and planned actions at SRP (including operation of L-Reactor).

Information was provided to the U.S. Fish and Wildlife Service (FWS) in 1982 regarding potential impacts to the red-cockaded woodpecker (Picoides borealis) from the restart and operation of L-Reactor. FWS reviewed the information and provided its Biological Opinion on February 25, 1983, that the proposed restart and operation of L-Reactor would not affect this species.

The Department of Energy is working with the Fish and Wildlife Service to develop a Habitat Evaluation Procedure (HEP) plan for the Steel Creek system with the implementation of the preferred thermal mitigation system for L-Reactor. The HEP will identify the value of habitat to be gained or lost with implementation of the preferred L-Reactor cooling-water alternative for use in assessing further mitigation. If required, the Department of Energy will implement additional mitigative measures that might be identified through the HEP process dependent on Congressional authorization and appropriation.

The dispersion, uptake, and concentration of radioactivity in the environment has been studied for several decades. Based on these studies, predictive methodologies are well established; these methodologies were used to predict the potential environmental consequences of the L-Reactor restart. Similarly, the effects of radiation exposure on many species of fishes, birds, and animals have been studied; the general conclusions are that biota other than man are less sensitive to radiation. The low concentrations of radioactive materials around the SRP are not expected to cause any measurable or observable effects in wildlife.

DOE monitors chemical discharges from the Plant. Results of the extensive SRP monitoring program are published annually and are available to the public. Liquid releases are governed by a permit issued by the State of South Carolina under the National Pollutant Discharge Elimination System; these releases are considered acceptable in relation to their potential effects on water quality and wildlife that use the waterways. This permit and the discharges made under it are monitored by DOE and the State of South Carolina. No effects on marine life in the Savannah River estuary or the Atlantic Ocean have been detected.

GROUND WATER

Comments

One of the most commented-on aspects of the Draft EIS concerned the discussion of potential ground-water impacts. Comments ranged from very broad statements that the restart of L-Reactor would increase ground-water contamination by 33 percent to several very specific comments on ground-water data, analysis methodology, and geohydrologic assumptions. Comments from state and Federal agencies also indicated a concern with respect to jurisdictional responsibilities under the Resource Conservation and Recovery Act (RCRA) and the relationship of proposed clean-up programs to any further contamination due to the restart of L-Reactor. In general, the majority of comments received reflected a concern that the restart of L-Reactor should not increase any existing levels of ground-water contamination. A few of the more specific categories of comments included:

- The protection afforded the Tuscaloosa Aquifer by the upward differential between the Tuscaloosa Formation and the overlying Congaree Formation was assessed inadequately.
- Ground-water withdrawal from the Tuscaloosa Formation in support of L-Reactor operation will affect the water levels in offsite wells.
- The Draft EIS is flawed by the lack of hydrogeological data for the immediate vicinity of L-Reactor and by its reliance, without proper justification, on data for the F- and H-Areas, which are about 10 kilometers away.
- Existing ground-water contamination and cleanup at support facilities for L-Reactor operation were not addressed adequately.

- Results of state-of-the-art mathematical modeling of wastewater flow from seepage basins, including mass balance calculations, should be presented in the Final EIS.

DOE response

The EIS discusses the expected total SRP ground-water withdrawal from the Tuscaloosa Aquifer, including increased pumping to support the operation of L-Reactor and its support facilities. This ground-water usage is about 75 percent of the lower bound estimate of the ground-water flux through the Tuscaloosa calculated in 1974. This usage is not expected to have appreciable effects on water levels in onsite wells. Finally, the EIS shows that the total withdrawal of ground water from the Tuscaloosa, including the withdrawal by L-Reactor and its support facilities, the Fuel Materials Facility, and the Defense Waste Processing Facility, will be about 75 percent of the flux through the Tuscaloosa on and near the SRP.

The head differences between the upper Tuscaloosa Formation and the Congaree Formation (Appendix F) were developed from measurements of the water levels made in monitoring wells, not in production wells. These water measurements were made when the production wells were in operation; thus, the calculated head differences have not been altered. A decline in the upper head differential of about 0.16 meters per year appears to be primarily related to pumping at SRP; however, part of this decline appears to be related to recent drought conditions. Because pumping rates are expected to be relatively stable in the future, this rate of decline is not expected to continue. This EIS separates the data on an aquifer basis to provide a better understanding of the hydrogeology.

Sections in this EIS dealing with M-Area ground-water contamination have been updated to reflect the latest ground-water and analysis data. These sections indicate that the entry of chlorinated hydrocarbons into the Tuscaloosa Aquifer occurred through migration in the Tertiary ground-water system through the defective cement grout of at least one production well. The implementation of the M-Area remedial action program will retard further migration of chlorinated hydrocarbons in the Tertiary ground-water system. Furthermore, DOE will discontinue the use of the M-Area basin by April 1985.

The monitoring of on-site and offsite wells has shown that contaminants have not migrated offsite and that no offsite health risk will exist in the foreseeable future. DOE is determining the effectiveness of a pilot stripper in the removal of chlorinated hydrocarbons from the Tertiary system beneath A- and M-Areas. State and Federal agencies have reviewed the remedial action program of removing the contaminants by the use of a combination of recovery wells and a large production air stripper. This system is expected to be operational by August 1984.

Discharges to the L-Area seepage basin and the incremental increases in discharges to the F- and H-Area seepage basins will impact shallow ground water beneath the basins. The hydrostratigraphic units beneath these seepage basins help protect the Ellenton and Tuscaloosa Aquifers. Waste streams released to the L-Reactor seepage basin are expected to discharge eventually to Steel Creek. Releases to F- and H-Area seepage basins will discharge to low-lying areas along Four Mile Creek. Radionuclide concentrations, when discharged from

these creeks to the Savannah River, will be within DOE guidelines for releases to uncontrolled areas.

The EIS discusses alternatives to the use of the L-Reactor seepage basin. Based on Congressional authorization and approval of a fiscal year 1984 funding request, DOE plans to operate an effluent treatment facility by October 1988 to process wastewater being discharged to the F- and H-Area seepage basins.

The State of South Carolina and the Environmental Protection Agency have reviewed a draft of the "SRP Groundwater Protection Implementation Plan." The plan is being finalized based on the review comments. This plan examines strategies and schedules for implementing ground-water mitigative actions, including the closing and decommissioning of seepage basins. As noted in the EIS, this plan will meet the requirements of DOE Order 5480.2, EPA regulations 40 CFR 260.25, and SCDHEC requirements. The decision on this plan will be the subject of a separate NEPA review.

The Department of Energy is committed to several items related to ground-water monitoring and mitigation at SRP, including (1) continuing and expanding the program of ground-water monitoring and studies; (2) involving the State of South Carolina in onsite and near-site ground-water monitoring activities; and (3) taking mitigation actions to reduce pollutants released to the ground water and establishing a mutually agreed-on compliance schedule for mitigation efforts.

NEED FOR MATERIAL AND PRODUCTION ALTERNATIVES

Comments

During the public review/comment period on the Draft EIS, several comments were submitted on the need for additional defense nuclear materials and several other accelerated production initiatives were suggested as alternatives to the restart of L-Reactor. The types of comments most frequently cited included:

- There was not sufficient information presented in Chapter 1 to provide a basis for supporting the definitive need to restart the L-Reactor in January 1984.
- Retired warhead material should be recycled.
- Because DOE has exceeded production goals for plutonium and there have been decreases in the numbers of new warhead deployments, the need for plutonium has been reduced.
- The early restart of the PUREX Plant will supply plutonium, thereby eliminating the need to restart the L-Reactor immediately.
- The Draft EIS did not consider production alternatives (Chapter 2) in sufficient detail.

DOE responses

The discussion on the need for L-Reactor and production alternatives in Chapters 1 and 2 is, by necessity, qualitative and limited because quantitative information on defense material requirements, inventories, production capacity, and projected material shortages or adverse impacts on weapon system deployment is classified. A quantitative discussion of the need for restarting L-Reactor and of production alternatives is provided for the DOE decisionmaker in a classified appendix (Appendix A) to this EIS.

The development of each annual Nuclear Weapons Stockpile Memorandum (NWSM) is based on detailed analyses of scheduled and planned new weapon systems, scheduled and planned weapon retirements, the current status of legislative actions concerning weapon systems and production capability, the current status of material inventory, material supply from weapon retirements, and material production and weapons fabrication. Each NWSM contains the results of analyses of these factors based on the information available at the time it is developed; therefore, changes in the status and plans for production and deployment of weapons are fully accounted for from one NWSM to the next. The analysis in the classified Appendix A of this EIS uses data consistent with the status of legislative actions and administration plans concerning weapon systems and material production at the time of development of the FY 1984-1989 NWSM, which was approved by President Reagan on February 16, 1984. If significant changes occur after the development of an NWSM, such as Congressional action potentially impacting material supply/demand, DOE factors the impact into the implementation of the NWSM requirements after the Department of Defense formalizes the modified requirements.

Originally, the PUREX Plant on the DOE Hanford Reservation was to resume operation by April 1984; however, the plant started operation 5 months ahead of schedule. The PUREX Plant does not produce plutonium; it separates reactor-produced plutonium from uranium and waste products. Its early restart will have very little effect on the supply of weapons-grade plutonium in the timeframe of concern for L-Reactor because sufficient supplies of fuel-grade plutonium are already available in inventory for blending and the capacity of the PUREX Plant is large in comparison with the backlog of fuel-grade material from N-Reactor available for processing. Furthermore, the early plant startup was factored into the material supply information in the FY 1984-1989 NWSM that was approved recently by President Reagan and was used as a basis for the need for L-Reactor in this final EIS.

In evaluating the need for defense nuclear materials and for restarting L-Reactor, DOE analyzed a delayed restart in Appendix A (classified). The implementation of the potential partial-production options discussed in Chapter 2 was also analyzed as a way to offset production losses associated with such a delay. The results of these analyses concluded that partial production alternatives, individually or in combination, would provide only a small fraction of the required defense nuclear materials that could be produced by L-Reactor.

DOE also analyzed all full-production options that would provide as much plutonium as the proposed restart of L-Reactor. This analysis considered existing production reactors as well as the potential use of spent commercial fuel. However, the conversion of spent commercial reactor fuel into weapons-grade plutonium is prohibited by law; legislative removal of this prohibition is

unlikely in the near future. The restart of other inactive DOE production reactors was also dismissed as unreasonable due to the time that would be required to restore these reactors for plutonium production.

RADIOACTIVE RELEASES

Comments

During the Draft EIS review period, comments were also raised regarding potential radioactive releases. Many of the comments reflected a general concern for potential radioactive contamination or an opinion that no level of radiation was safe. Many commentors also were concerned with the comparability of L-Reactor radiological releases to those of a commercial nuclear power reactor. Other categories of comments included:

- Prior reports on SRP accidents and routine releases should be used as sources for estimated radioactive releases.
- Measures should be taken to prevent the remobilization of radiocesium.
- Release data are not readily available to the public.
- The EIS should present the cumulative impacts of nuclear facilities in the Savannah River Basin.

DOE responses

The estimates of radioactive releases to the environment resulting from L-Reactor startup are based not only on design information but also on the experience and measurement of releases for more than 25 years of operation of the Savannah River Plant. Routine releases from the proposed operation of L-Reactor and the increased releases from associated facilities that will support L-Reactor operation, such as the separations facility, were included. The releases for L-Reactor were based on the average measured releases of the operating C-, K-, and P-Reactors from 1978 through 1980. The analysis of routine and incremental radioactive releases do not include releases from SRP facilities that are not associated with L-Reactor operation; however, the nonassociated releases and the releases from other planned SRP facilities are analyzed in the discussion of cumulative releases.

The radioactive releases from L-Reactor and its support facilities to the aqueous environment result in concentrations in drinking water (e.g., in Beaufort/Jasper and Port Wentworth) that are very small fractions of the EPA drinking-water standard value. Estimates of atmospheric releases from L-Reactor and its support facilities result in small incremental increases in ambient atmospheric concentrations that are within all applicable state and Federal guidelines. The restart of L-Reactor will be in compliance with the DOE radiation protection standards that are comparable to those of the Nuclear Regulatory Commission (10 CFR 20) for a production facility (i.e., 500 millirem to the whole body in one calendar year).

The remobilization and transport of radiocesium and radiocobalt from Steel Creek sediments caused by the direct discharge of L-Reactor cooling water have been studied and assessed in detail. The resulting concentrations in the Savannah River will be very small. The concentrations from these releases in potable water from the Beaufort-Jasper and Cherokee Hill water-treatment plants were calculated to less than 1/2200th (for radiocesium) and less than 1/4160th (for radiocobalt) of the EPA drinking-water standard values. Radiocesium and radiocobalt releases for the Department's preferred cooling-water alternative (1000-acre lake) are estimated to be no greater than those from the direct discharge of cooling water.

DOE measures concentrations of radioactivity in air, water, and soil in the region due to releases from SRP as part of its annual environmental monitoring program. These concentrations, along with the doses to the maximally exposed individual and the general population offsite, are reported to the public in annual SRP environmental monitoring reports. The resulting doses are well within established limits and represent a very small fraction of background radiation doses. No detrimental effects due to SRP radioactive releases have been observed, and analyses indicate that none should be expected. Expanded monitoring, to assess the displacement of radioactive isotopes in Steel Creek and in the Savannah River swamp will be included in future issues of the SRP environmental monitoring report.

Abnormal release information is also reported. Tritium releases and their consequences have been well documented in Environmental Effects of a Tritium Gas Release from the Savannah River Plant on May 2, 1974 (DP-1369), Environmental Effects of a Tritium Gas Release from the Savannah River Plant on December 31, 1975 (DP-1415), and the publicly available 1975 annual report, Environmental Monitoring in the Vicinity of the Savannah River Plant (DPSPU-76-30-1). Abnormal releases are documented in the annual environmental monitoring reports.

The EIS presents and discusses the cumulative radiological effects of all nuclear facilities expected to be operating within an 80-kilometer radius of L-Reactor. Specifically, the EIS considers the potential cumulative radiological releases from all existing and planned SRP operations, the Alvin W. Vogtle Nuclear Power Plant (under construction), the Barnwell Nuclear Fuel Plant (not expected to operate), and the Chem-Nuclear Services, Inc., low-level radioactive disposal site.

RADIOLOGICAL EFFECTS

Comments

In addition to the comments concerning radioactive releases, other comments were received during the Draft EIS review period on the effects of those releases. Major categories of comments on radiological effects included:

- Effects of cumulative low-level exposure are not addressed adequately.
- Method of estimating doses is not presented adequately.

- Bases of estimates of effects (e.g., radiation-induced cancer) are not presented adequately.
- Detrimental effects of radioactive releases on workers and people in the area over the past 25 years are not considered adequately.

DOE responses

Using the radioactive release information discussed in the previous section, standard dosimetry models were used to calculate radiological doses. The dose models are based on recommendation of the International Commission on Radiological Protection. Appendix B of the EIS discusses the methodologies used in calculating the radiological doses and resultant estimates of health effects.

The operation of L-Reactor and its associated support facilities will increase the dose to the population within an 80-kilometer radius and to downstream users of Savannah River water by an amount equivalent to about 0.05 percent of the natural background radiation. The incidents of effects of such exposures are considerably below measurable levels.

The BEIR III report (The Effects on Populations of Exposures to Low Levels of Ionizing Radiation), published by the National Academy of Sciences in 1980, was used as a basis for establishing a relationship between radiological doses calculated in the EIS and any resulting health effects in terms of excess cancer fatalities. Estimates of radiation health effects in this report are based on the observed incidence of cancer-induced fatalities that resulted from exposures to high radiation levels. This data base included information derived from studies of survivors of the atomic bombs dropped on Nagasaki and Hiroshima, and from medical procedures that result in high radiation doses. The basic problem addressed in the BEIR III report was how to extrapolate from health effects observed at high levels of radiation to estimates of health effects that might be associated with very low levels of radiation, such as those resulting from L-Reactor operation. In this sense, the BEIR III report is largely a statistical study of empirical data, rather than a theoretical report.

The BEIR III report was selected for use in the EIS in preference to evidence directly related to SRP because no observable health effects resulting from SRP operations, in terms of excess cancer fatalities, can be quantified or identified.

Exposures of SRP workers to internal and external radiation are carefully monitored and controlled through a health physics program designed to maintain occupational doses "as low as reasonably achievable" (ALARA), as outlined in Environmental Protection, Safety, and Health Protection for DOE Operations, DOE 5484.1a.1, (1981). Occupational doses at SRP to date have been well below DOE limits of 5 rem per year. Furthermore, occupational doses associated with reactor operations have decreased from an average of 200 person-rem per reactor-year during the period from 1960 through 1968 to an average of 69 person-rem per reactor-year during the period from 1976 through 1980, as a result of the ALARA operating philosophy.

Of the 411 production workers who (through October 1983) have shown positive evidence of assimilation of transuranic elements, including plutonium, only 6 have exceeded 50 percent of a Maximum Permissible Body Burden (MPBB), as

defined by the International Commission on Radiological Protection ("Report of ICRP Committee II on Permissible Dose for Internal Radiation," Health Physics, Volume 3, 1960). The maximum individual assimilation was 90 percent of MPBB. During the entire operation of the Savannah River Plant, only one worker has exceeded the occupational exposure limit of 5 rem per year. No biological effects are expected from exposures of this magnitude. An ongoing health study of SRP workers has shown no evidence of unusual health effects that could be attributed to radiation exposure.

A series of health effects studies of the population around the Savannah River Plant has been made by Professor H. J. Sauer, who was originally with the University of Missouri and is now an independent contractor. Epidemiological studies of the SRP workers are being made by Oak Ridge Associated Universities and the Los Alamos National Laboratory. The Centers for Disease Control has also made some studies of the occurrence of a rare blood disease, Polycythemia Vera, in response to newspaper reports, since retracted, that this disease was unusually prevalent in the vicinity of SRP. Further, the Centers for Disease Control, in response to requests from DOE, has formed an independent panel to determine the need for any additional studies that might be desirable. These past and ongoing studies will ensure that reasonable efforts continue with regard to health effects from SRP operations, even though these effects are predicted to be too small to be statistically detectable.

SAFETY ANALYSIS

Comments

Comments on the accident analyses and safety system sections of the Draft EIS included:

- Need for a containment building.
- Comparability of L-Reactor to the NRC's requirements for nuclear reactor site criteria.
- Presentation of a "worst-case" analysis.

For the most part, the comments on the need for a containment building were general, often only citing that commercial reactors are required to have them and L-Reactor is not. Other comments on the need for a containment building concerned the comparability of the accident analyses for L-Reactor to the Nuclear Regulatory Commission's requirements for reactor site criteria (10 CFR 100). Specifically, commentators contended that a postulated 100-percent core-melt accident was the proper basis for assessing the safety comparability of L-Reactor to commercial reactors. They also contended that if the 100-percent core-melt accident were used as the basis, the L-Reactor would not meet the Nuclear Regulatory Commission's site evaluations factors for commercial reactors.

Finally, others contended that the Draft EIS failed to present a worst-case analysis. Specifically, commentators asserted that the EIS, rather than presenting the consequences of a 10-percent postulated core-melt accident, should present the consequences of a 100-percent core-melt accident concurrent with a failure of the confinement system.

DOE responses

The need for containment buildings for commercial reactors is based on their design, site characteristics, and the need for specific engineered safety features to limit radioactive releases in the event of an accident. Reactors of different designs and engineered safety features other than a containment building can also limit radioactive releases to be within acceptable standards for a range of postulated accidents. The Fort St. Vrain reactor, which has been licensed by the Nuclear Regulatory Commission, is an example of a commercial reactor without a containment building; it has a different design and alternative engineered safety features from commercial light-water reactors.

The L-Reactor has several important design features and alternative engineered safety features that must be considered in any comparison with light-water commercial reactors. For example, L-Reactor operates at much lower pressures and lower temperatures than commercial light-water reactors; thus, the stored energy in a postulated loss-of-coolant accident--which is of primary concern in the need for a containment building--is much less. Other important differences exist for operational limits, emergency shutdown systems, the confinement system, the type of fuel, and the distance to the nearest site boundary. These differences, when taken into account in the analysis of credible accident events and resultant consequences, indicate that L-Reactor with its confinement system would meet the Nuclear Regulatory Commission's site evaluation factors.

The regulations in 10 CFR 100 do not assume or require the assumption of "a full-core meltdown." Rather, the footnote to 10 CFR 100.11(a) clearly indicates accidental events, that would result in potential hazards not exceeded by those from any accident considered credible. Such accidents have generally been assumed to result in substantial meltdown of the core with subsequent release of appreciable quantities of fission products. "Full-core meltdown" is not equal to "substantial meltdown;" the 10 CFR 100 reference to TID-14844 particularly notes that: "The calculations described [in TID-14844] may be used as a point of departure for consideration of particular site requirements which may result from evaluation of the characteristics of a particular reactor, its purpose and method of operation. Thus, the source-term assumption cited is not mandated for use, either in 10 CFR 100 or in TID-14844.

The NRC licensing of the Fort St. Vrain reactor is an example of a reactor licensed with recognition of the differences between its design and the design of light-water reactors (LWRs). This reactor does not have a containment building, but has alternative safety features that the NRC considers to be adequate. Recognizing the high heat capacity of this graphite-moderated reactor, no fuel melting was assumed when specifying the source term for use with 10 CFR 100. Release of gases as a result of core heatup (not melting) was assumed over a period of hours, not instantaneously as is commonly assumed for LWRs. Furthermore, release of only 5.5 percent of the halogens in the reactor core was assumed, rather than the 50 percent commonly assumed for LWRs.

The Department of Energy recognizes uncertainties inherent in the predictions and likelihood of extremely low probability but high-consequence accidents. The worst-case analysis required by NEPA is intended to provide the decisionmaker with information to balance the need for the action against the risk of possible adverse impacts if the action were to proceed in the face of uncertainty. The "uncertainty" in this instance, however, does not question the severity of the consequences if this class of accident were to occur, but rather the degree of improbability of its occurrence (i.e., whether once in 10 million years or once in a billion or more years). The detailed analyses of the very-low-probability, 10-percent, core-melt accident, together with available preliminary information on the consequences and probabilities of a spectrum of more severe but even less probable accidents included in the EIS are judged to provide the decisionmaker with sufficient information for this purpose.

Table M-1. Comments and statements received on the L-Reactor Draft
Environmental Impact Statement

Designation	Individual or organization	Page
AA	Tim Lambert	M-21
AB	Ruth Thomas, Environmentalists, Inc.	M-24
AC	Robert F. Burnett, U.S. Nuclear Regulatory Commission	M-36
AD	David G. Jennings	M-37
AE	John C. Snedeker, Lyric, Inc.	M-44
AF	J. Kelly Nelson, Jr.	M-47
AG	Mrs. Ellen G. S. Spires	M-49
AH	Mary Lira and Witold Kosicki	M-50
AI	Mrs. Jean May	M-51
AJ	Robert H. Driggers	M-53
AK	Fred M. Reese, Jr.	M-57
AL	Mrs. R. W. Whisnant	M-59
AM	Mrs. Zelda Noland	M-60
AN	Catherine C. Bradshaw	M-61
AO	Mary Emma Gleffe	M-62
AP	Janet T. Orselli, Radiation Awareness	M-63
AQ	Mary G. Dabbs	M-67
AR	Sherry W. Clements	M-68
AS	Agnes H. and Charles H. Everett	M-69
AT	Robert J. Marshall, Lutheran Theological Southern Seminary	M-70
AU*	Town of Jackson, South Carolina	M-72
AV*	Dorethea Smith	M-74
AW	A. R. Jarrett, Ph.D., P.E., Pennsylvania State University	M-77
AX*	Ira Davis	M-83
AY*	Dr. Judith E. Gordon, Sierra Club, South Carolina Chapter	M-85
AZ*	John Stanyarne Wilson	M-92
BA*	Karen Arrington	M-94
BB	Mr. and Mrs. John P. Swain, IV	M-97
BC	Mrs. Judith G. Catoe	M-98
BD	Mr. and Mrs. Charles F. Cook	M-99
BE	Bill Carroll	M-100
BF*	Beatrice D. Jones	M-102
BG*	Dr. Mary T. Kelly, League of Women Voters of South Carolina	M-108
BH*	W. F. Lawless	M-112
BI*	Mr. William McDaniels	M-115

*Comments or statements received at one of the four public hearings held by DOE on the Draft EIS during the week of October 31, 1983.

Table M-1. Comments and statements received on the L-Reactor Draft Environmental Impact Statement (continued)

Designation	Individual or organization	Page
BJ*	Dorcas Elledge	M-118
BK*	Mr. James W. Hammond	M-120
BL*	Dr. Thomas B. Cochran on Behalf of the Natural Resources Defense Council	M-121
BM*	Frances Close Hart, Energy Research Foundation	M-150
BN*	Terrence C. Larimer, Southeastern Representative for the National Audubon Society	M-156
BO*	R. I. Newman, P.E.	M-159
BP*	Honorable Harriet Keyserling, South Carolina State Representative	M-165
BQ*	Dr. Zoe Tsagos, League of Women Voters of Northern Beaufort County	M-167
BR*	Sister Ellen Robertson	M-173
BS*	Sister Miriam Bauerlin	M-175
BT*	Hans Neuhauser, The Georgia Conservancy	M-176
BU*	Ken Matthews, Savannah Area Chamber of Commerce	M-183
BV*	Sister Charlene Walsh, R.S.M.	M-185
BW*	Charles Milmine	M-187
BX*	James D. Howard	M-190
BY*	Geraldine LeMay, League of Women Voters of Georgia	M-192
BZ*	Virginia Brown	M-196
CA*	Virginia Brown, League of Women Voters of Savannah-Chatham	M-198
CB*	Wolfgang Bengtsson	M-200
CC*	Wiebke Bengtsson	M-202
CD*	William McLaughlin	M-204
CE*	Miriam Litchfield	M-206
CF*	L. Noreene Parker	M-207
CG*	Amy Darden	M-210
CH*	Carolyn Tucker	M-214
CI*	Steve A. Johnson, Ph.D.	M-215
CJ*	Edwin Longwater	M-218
CK*	Janiece Brodhead	M-221
CL*	Linda M. Jeanne	M-222
CM*	Debbie Kearney	M-223
CN*	Ms. Cheryl Jay	M-225
CO*	Judy Jennings	M-226
CP*	Rebecca R. Shortland, Coastal Citizens for a Clean Environment	M-227

*Comments or statements received at one of the four public hearings held by DOE on the Draft EIS during the week of October 31, 1983.

Table M-1. Comments and statements received on the L-Reactor Draft Environmental Impact Statement (continued)

Designation	Individual or organization	Page
CQ*	Arthur G. Linton, U.S. Environmental Protection Agency, Region IV	M-231
CR*	Ms. Helen Bloom	M-233
CS*	Andreas Nissen	M-235
CT*	Mr. John Maclean	M-236
CU*	Mr. Larry Sprague	M-239
CV*	Paul S. Draper, L. R. Castilian, Louisa Green, Randy (Chill), A. L. Weeks, Charles H. Rawlinson, Thomas M. Combs, Steve Hiers, William Olive, John Griffin, and Cecil Pryor	M-242
CW	Arthur H. Dexter	M-243
CX	R. Eileen Buller	M-246
CY	Maxine M. Warshauer	M-249
CZ	Frank von Hippel	M-250
DA	Charles R. Jeter, Regional Administrator, U.S. Environmental Protection Agency, Region IV	M-259
DB	Marguerite S. Rice	M-288
DC	Michael Murray	M-290
DD	Lawrence D. Benedict	M-291
DE	Eugene J. Carroll, Jr.	M-293
DF	Suzanne A. Shuman	M-295
DG	Amy G. Darden	M-296
DH	Dorethea Smith	M-298
DI	Frances Close Hart, Energy Research Foundation, submittal of statement of Dr. George William Rathjens	M-300
DJ	John Winthrop	M-306
DK	B. G. Cloyd and W. H. Rice, Jr., U.S. Department of Transportation, Federal Highway Administration, South Carolina Division Office	M-307
DL	H. Wayne Beam, South Carolina Coastal Council	M-309
DM	Carolyn A. Tucker	M-311
DN	Jan Beyea, Ph.D., National Audubon Society	M-312
DO	George P. Lupton, M.D.	M-318
DP	William JH Caldicott, MB, BS	M-319
DQ	Honorable Timothy F. Rogers, South Carolina House of Representatives	M-322
DR	Daniel L. Childers	M-326
DS	Alexander Sprunt, IV, National Audubon Society	M-333
DT	Linda Morgan	M-335
DU	Robert Winthrop II	M-336
DV	Liz Paul, Groundwater Alliance	M-337

*Comments or statements received at one of the four public hearings held by DOE on the Draft EIS during the week of October 31, 1983.

Table M-1. Comments and statements received on the L-Reactor Draft Environmental Impact Statement (continued)

Designation	Individual or organization	Page
DW	M. R. Johnson	M-339
DX	Sally Battle	M-340
DY	John E. Alcock, U.S. Forest Service	M-341
DZ	Larry L. Caldwell	M-342
EA	Geoffrey I. Scott, Ph.D., and Charles E. Feigley, Ph.D.	M-345
EB	Sue Cramer	M-348
EC	Michael Gardner	M-349
ED	William P. Davis	M-350
EE	Carolyn N. Tutwiler	M-351
EF	Harry M. Dalton	M-352
EG	George C. Battle	M-353
EH	Joyce P. Dubuc	M-354
EI	Charles T. Hess	M-355
EJ	F. John Vernberg	M-360
EK	Richard E. Watkins	M-363
EL	Alfred H. Vang, Executive Director, South Carolina Water Resources Commission	M-364
EM	Ruth Thomas, Environmentalists, Inc.	M-372
EN	S. Jacob Scherr, Natural Resources Defense Council	M-386
EO	William A. Lochstet, Ph.D.	M-425
EP	John H. Maclean	M-432
EQ	John M. Croom, Quantitative Applications	M-439
ER	Colonel Charles E. Dominy, U.S. Department of the Army, Savannah District Corps of Engineers	M-442
ES	Robert Alvarez, Environmental Policy Institute	M-443
ET	Caroline O'Rourke	M-457
EU	Honorable D. M. McEachin, Jr., South Carolina House of Representatives	M-458
EV	John M. Croom, Quantitative Applications	M-460
EW	Legal Environmental Assistance Foundation (LEAF)	M-476
EX	Basil G. Savitsky	M-483
EY	Maureen K. Murray	M-501
EZ	Dr. Judith E. Gordon, Sierra Club, South Carolina Chapter	M-502
FA	L. L. Gaddy	M-505
FB	Kerry Cooke, Snake River Alliance	M-507
FC	Paul F. Walker, Ph.D., Klein Walker Associates, Inc.	M-509
FD	Gary H., Robert H., and Dorothy J. Whitaker	M-514

*Comments or statements received at one of the four public hearings held by DOE on the Draft EIS during the week of October 31, 1983.

Table M-1. Comments and statements received on the L-Reactor Draft Environmental Impact Statement (continued)

Designation	Individual or organization	Page
FE	Pixie A. B. Newman	M-515
FF	Honorable Joe Frank Harris, Governor, State of Georgia	M-526
FG	Honorable Richard L. Ottinger, United States House of Representatives	M-534
FH	R. Lewis Shaw, P.E., South Carolina Department of Health and Environmental Control	M-538
FI	James A. Timmerman, Jr., South Carolina Wildlife and Marine Resources Department	M-545
FJ*	Dr. E. W. Murbach	M-549
FK	Bruce Blanchard, U.S. Department of the Interior	M-550
FL	John C. Villforth, Director, National Center for Devices and Radiological Health, Food and Drug Administration	M-560
FM	Honorable T. Travis Medlock, Attorney General, State of South Carolina	M-563
FN	V. I. Montenyohl	M-566
FO	Mark Senn, CSRA Planning and Development Commission	M-569

*Comments or statement received at one of the four public hearings held by DOE on the Draft EIS during the week of October 31, 1983.

Table M-2. DOE responses to comments on Draft EIS

Comment number	Comments	Responses
STATEMENT OF TIM LAMBERT		
Tim Lambert Rt 3 Box 510 Dahlonega, GA 30533		
To: M. J. Sires III,		
I am concerned about the impact the L-Reactor at Savannah River Plant. If you could send me a copy of the Environmental Impact Statement on this issue, it will help me to assess the problem at hand.		
AA-1	From all the information I have so far gathered on the L-Reactor, it seems as though more stringent criteria must be met before it goes on line. For one, cooling towers should be built to reduce thermal pollution. This type of pollution is quite serious, especially when discharged into the delicate swamp ecosystem around the SRP.	Section 4.4.2 of the EIS, which discusses cooling-water mitigation alternatives, has been revised based on public comments received on the draft EIS. Specifically, Section 4.4.2 has been revised to provide a detailed discussion of additional combinations of various cooling-water systems. In Section 4.4.2, each of the cooling-water mitigation systems is evaluated for attaining the thermal discharge limits of the State of South Carolina. Section 4.4.2 and a revised Appendix I, Floodplain/Wetland Assessment, discuss the wetland impacts of each of the systems considered. The Department of Energy has been reviewing and evaluating alternative cooling-water systems for L-Reactor. Based on these reviews and evaluations, and consultations with representatives of the State of South Carolina regarding a mutually agreed upon compliance approach, a preferred cooling-water mitigation alternative is identified in this EIS. The preferred cooling-water alternative is to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in the lake. The Record of Decision prepared by the Department on this EIS will state the cooling-water mitigation measures that will be taken which will allow L-Reactor operation to be in compliance with the conditions of an NPDES permit to be issued by the State of South Carolina.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AA-2	I am also concerned about the amount of radioactive wastes, already in the Savannah river when the L-Reactor is put back into use.	The remobilization and transport of radiocesium and radiocobalt from Steel Creek for the direct discharge of L-Reactor cooling water is discussed in Chapter 4 and Appendix D. As discussed in Section 4.1.2.4, the radiological effects from these releases will be very small. The concentrations from these releases in potable water from the Beaufort-Jasper and Cherokee Hill water-treatment plants are calculated to be less than 1/2200th and 1/4160th of the EPA drinking-water standards for cesium-137 and cobalt-60, respectively. The concentrations that might result from the implementation of the Department's preferred cooling-water alternative (1000-acre lake) are estimated to be no greater than those from direct discharge. Based on an average river flow rate of 294 cubic meters per second and tritium release values listed in Table 4-10, tritium concentrations in Beaufort-Jasper and Port Wentworth water will be 39 picocuries per liter and 1034 picocuries per liter from L-Reactor operation in the first and tenth years, respectively. These are 0.2 and 5.2 percent, respectively, of the EPA drinking-water standard of 20,000 picocuries per liter. Section 5.2.6 of the EIS discusses the estimated cumulative radionuclide concentrations in the Savannah River and in Port Wentworth and Beaufort-Jasper drinking water from routine operation. The total radiation exposures from the restart of L-Reactor when added to existing exposures is expected to be about one-twelfth of the EPA drinking water standard for the Beaufort-Jasper system.
AA-3	I believe if the Savannah River Plant had to operate under the same standards as private plants in South Carolina, these two problems would be taken care of.	As discussed in the responses above, the proposed restart of L-Reactor will be in compliance with an NPDES permit issued by the State of South Carolina, and the release of radioactive material will result in radiation doses that are well below natural background radiation or applicable standards. Chapter 7 of the EIS presents the Federal and state environmental protection regulations that are applicable to the restart of L-Reactor. The restart of L-Reactor will comply with all regulations. These regulations include those developed under the Clean Air Act and Clean Water Act that any "private plant" would have to meet, as well as the requirements of the Department of Energy

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		such as those for hazardous waste and radioactive releases. The Department's requirements in these areas do not differ from applicable requirements of other governmental agencies. For example, the SRP hazardous waste management program meets the technical requirements of the EPA hazardous waste regulations, and the Department's radiation protection standards are comparable to those of the Nuclear Regulatory Commission (10 CFR 20) for a production facility (i.e., 500 millirem to the whole body in any one calendar year).

Please send the Environmental Impact Study to the above address. Thank you.

Sincerely,

Tim Lambert

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	STATEMENT OF RUTH THOMAS Environmentalists, Inc. Founded 1972 October 6, 1983 Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U. S. Department of Energy Savannah River Operations Office P. O. Box A Aiken, South Carolina 29801 Dear Mr. Sires: PRELIMINARY COMMENTS ON THE L-REACTOR DRAFT ENVIRONMENTAL IMPACT STATEMENT Those of us in Environmentalists, Inc. who are working on a review of the Draft Environmental Impact Statement (Draft EIS) regarding the proposed restart of the L-Reactor have decided to submit two sets of comments related to this Department of Energy report. By sending in preliminary comments now, the preparers of the Draft EIS and their advisors will have more time to incorporate additions and corrections into the Final Environmental Impact Statement. (Final EIS)	
AB-1	It is our understanding that representatives of the Department of Energy (DOE) and state agencies have had meetings to discuss possible changes to the working Draft EIS. We suggest that consideration be given to having meetings between representatives of DOE and representatives of commenting organizations, including Environmentalists, Inc. (E.I.)	As required by the provisions of the Energy and Water Development Appropriations Act, 1984, DOE prepared this Environmental Impact Statement on an expedited basis "...in consultation with State officials of South Carolina and Georgia...." DOE conducted a 45-day public comment period and held four public hearings to receive comments on the Draft EIS. Also see the response to comment AB-21.
AB-2	<u>THE NEED FOR THE L-REACTOR</u> The Draft EIS provides very little information related to the issue of whether the operation of the L-Reactor is needed at this time. Statements regarding the proposal to produce more	The need for the proposed restart of L-Reactor for the Department of Energy to meet its statutory production requirements is discussed qualitatively in Chapter 1. The production alternatives for L-Reactor are discussed qualitatively in Chapter 2.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	plutonium and increase the country's nuclear stockpile are based on classified information (Appendix A).	The discussion on the need for L-Reactor and production options is, by necessity, qualitative and limited because quantitative information on defense material requirements, inventories, production capacity, and projected material shortages or adverse impacts on weapon system deployments is classified. A quantitative discussion of the need for restarting L-Reactor is provided for the DOE decisionmaker in a classified appendix (Appendix A).
AB-3	The Draft EIS does not include a discussion of the different views which exist regarding the question of what role nuclear weapons build up plays in maintaining peace. There are people who believe that increasing our stockpile of atomic weapons is not a beneficial action for this country to take. Senators Hollings, Hart and Cranston are among the U.S. legislators who have voted to reduce nuclear arms stockpiles. John Glenn, a staunch supporter of a strong military, opposes the MX and favors a nuclear freeze.	Under the Atomic Energy Act of 1954, the Department of Energy is responsible for developing and maintaining the capability to produce all nuclear materials required for the U.S. weapons program. In accordance with the Atomic Energy Act, approval of proposals for defense nuclear materials by the President and subsequent authorization and appropriation by Congress constitute the legal authority and mandate for the Department of Energy to provide the required defense nuclear materials. The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.
AB-4	The Draft EIS does not provide evidence which makes the "systematic" balancing of costs vs benefits possible, yet this is a requirement of the National Environmental Policy Act of 1969 (NEPA). If the DOE is to justify the plan to operate the L-Reactor, the agency must first supply the evidence necessary to support the statement that the benefits offset the environmental costs. <u>PRODUCTION ALTERNATIVES</u>	The EIS presents a detailed description of the environmental consequences associated with the proposed restart of L-Reactor operation as well as qualitative and quantitative (Appendix A - classified) discussions of the need for defense nuclear materials and production alternatives to the restart of L-Reactor. In addition, mitigation alternatives are discussed in Chapter 4. The EIS, therefore, presents the information necessary for the decisionmakers.
AB-5	On page 2-1 in the Draft EIS, the statement is made that none of the production options or combinations of options to the restart of the L-Reactor can provide the needed atomic weapons materials. The information provided on this subject is not adequate to fulfill the requirements of the NEPA, specifically Section 102 (C) (iii) and (D). These provisions in Section 102 of the NEPA refer to alternatives to the proposed action under consideration. In their	Chapter 2 of this EIS contains additional information on production alternatives. Also see the response to comment AB-4 regarding information contained in the EIS on need and production alternatives. Section 104 of the National Environmental Policy Act provides that the Act does not eliminate any duties already imposed by other "specific statutory obligations." The discussion on the need for L-Reactor and production options is, by necessity,

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	decision of July 25, 1971,¹ Circuit Judges Wright, Tamm and Robinson stated that the phrase "to the fullest extent possible" applies to all of the requirements in Section 102 of the NEPA law, and thus inquiry into the subject of production alternatives needs to be more thoroughly carried out in the Final EIS.	qualitative and limited because quantitative information on defense material requirements, inventories, production capacity, and projected material shortages or adverse impacts on weapon system deployments is classified. Disclosure of classified material is not governed by Section 102 of NEPA. Pursuant to the amendments to the National Environmental Policy Act of 1969 in 1975, Section 102(2)(D) is now Section 102(2)(E).
AB-6	The discussions of production alternatives refer to only a few information sources. When a connection is made between the text and a reference listed at the end of a section, the pages in the document are not identified. Of the nine references listed on page 2-30, five of them are du Pont reports and one was done by United Nuclear, Inc. The state agencies we contacted do not have these reference sources. In the past, I have been unable to obtain a majority of du Pont reports related to EIS prepared by DOE. These six references may also be unavailable to the public. We object to the use of reports as references when such reports are not made available to those reviewing draft or final Environmental Impact Statements.	The EIS uses an appropriate format for identifying reference materials. All references are identified clearly in the text and at the end of each chapter. All documents referenced in the EIS are available for public review in the DOE public reading rooms in Aiken, South Carolina, and Washington, DC, as stated in the Federal Register Notice (48 FR 44244) and the Foreword of the EIS.
AB-7	In Volume 2 of the Draft EIS, the testimony and scoping letters of individuals, government agencies and citizens' organizations are printed with information identifying where the responses to comments and questions are located in the Draft EIS. A sampling of these responses showed us that the identified presentations in the text frequently do not adequately address the concerns expressed by those commenting. For example, the Draft EIS only presented information about two of the production alternatives which were recommended for consideration by the Natural Resources Defense Council (NRDC). It is unclear why the remaining four options were not considered.	An initial scope of the EIS was developed based upon the comments received on the L-Reactor Environmental Assessment, the February 9, 1983 Senate Armed Services Committee Hearing, and during the 90-day extended public review/comment period on the record of the February 9th hearing. Based on the comments received during the scoping period for this EIS, a final scope was determined. All comments received during the scoping period were considered; however, only substantive comments received during the scoping period resulted in changes to the content of the Draft EIS.

¹United States Court of Appeals for the District of Columbia Circuit, Nos. 24,839 and 24,871, Calvert Cliffs' Coordinating Committee, Inc., et al vs United States Atomic Energy Commission and United States of America, July 25, 1971.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AB-8	To comply with NEPA, the following production alternatives must be studied and the findings presented in the Final EIS. (NEPA, Section 102, (D)1):	
	"1. Accelerating the recovery of nuclear materials from the retirement of obsolete warheads.	The timing of the retirement of old warheads is the responsibility of the Department of Defense (DOD) and not the Department of Energy (DOE). The availability of material from retired weapons is included in the determination of material supply for new weapons in the NWSM. DOE recovers this material when the old warheads are made available from DOD, and uses this material to meet new material requirements.
	2. Accelerating development of a new production reactor.	Environmental, safety, and design studies are being initiated for a new production reactor (NPR). However, no funds have been appropriated for construction. A site and a reactor concept will be selected following completion of these studies. The NPR, even if built under an accelerated schedule, will not be available to produce the needed plutonium in the time required and is, therefore, not a reasonable alternative.
	3. Accelerating development of special isotope separation	The Department of Energy is currently proceeding with the development of the special isotope separation process as a method to convert fuel-grade plutonium to weapons-grade plutonium. This process has been demonstrated only in the laboratory. A significant period of time (greater than 7 years) will be required to scale from the present laboratory scale process up to a full production facility. Such a scale-up, even in the case of a maximum acceleration (1-2 years savings), would not produce the needed plutonium in the time required. This process, therefore, is not considered a reasonable alternative.
	4. Acquiring plutonium from a foreign source." ²	The prospect of obtaining plutonium from foreign sources has been explored and is not considered a reliable source for meeting plutonium needs.

²The scoping letter of Natural Resources Defense Council, August 9, 1983. Volume 2 of the Draft EIS, pages 103-104.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AB-9	The classified Appendix A was again cited as a document which contained supporting information. (page 2-22) Either this Appendix needs to be reclassified or another reference or references identified as the basis of statements and conclusions in the Final EIS. In NRDC's comments related to production alternatives, the organization's attorney points out that "the Draft EIS must provide and disclose to the public, to the fullest extent possible, the following information: 1. Identification of each material production alternative through 1995. 2. Identification by year of the Plutonium-equivalent production capability of each alternative. 3. Identification for each year of the Plutonium-equivalent inventory, stockpile, and future requirements. 4. Indication of precisely which, if any, weapons systems or warheads would have to be delayed if the L-Reactor operation was postponed one, two, three or four years. 5. Indication of whether and how a delay in L-Reactor operation of one or two years would affect the production of warheads already scheduled to 1988, or Plutonium contingency needs in the "out years."³ There appears to be little in the Draft EIS regarding these five subjects, particularly in terms of specific information. The lack of adequate identification of evidence to support the agency's statements and conclusions regarding Plutonium production and related matters needs to be corrected in the Final EIS in addition to providing more detailed information about weapons inventories and production schedules.	See the response to comment AB-2 regarding the disclosure of classified information in Appendix A. The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

³NRDC's Comments, Volume 2 of the Draft EIS, page 104.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>SAFETY SYSTEM ALTERNATIVES</u>		
AB-10	The Draft EIS includes presentations on five alternatives for mitigating the detrimental effects of accidents. There is, however, no explanation of why the authors did not make use of reports on actual accidents at the Savannah River Plant (SRP) in comparing various systems for reducing the harm which could result from accidents. Since the operation of the L-Reactor would increase the need for reprocessing, for the disposal of low-level radioactive waste, the conversion of liquid waste to a solid, transportation to a repository and permanent disposal of high-level waste, the records of SRP accidents related to all of these are indispensable sources of evidence for those evaluating safety system options and considering the potential which SRP facilities have for damaging the environment. In our Freedom of Information request of August 25, 1983, we asked for materials regarding tritium releases from the SRP, including the most recent leak on July 16, 1983. According to the DOE, there are approximately two hundred documents related to the routine and accidental discharges of this one source of radioactive pollution.⁴ Despite the existence of hundreds of reports about tritium and many additional ones related to radioactive gases and fallout originating from SRP facilities, these information sources do not appear to be among the references used in the preparation of the Draft EIS.	Actual reactor accidents are described in Section 4.2.1.2 and Appendix G; they were considered in the evaluation of safety system alternatives. Only once in the history of SRP reactor operation was the confinement system required to function to confine airborne activity; this was the melting of a source rod in 1970 (see Section 4.2.1.2 and Appendix G). The confinement system worked as designed and offsite exposure was negligible. The use of this accident in a comparison of various alternatives for the mitigation of accident consequences would have shown little or no difference in the effectiveness of the alternative concepts. Therefore, the maximum credible accident was selected to measure the benefits attributable to each alternative reactor safety system that is considered. A new Section 5.1.2.9 has been incorporated into this EIS which discusses the most probable incremental risks of non-reactor support facilities due to the increased throughput of L-Reactor product. Hypothetical reactor accidents described in the EIS represent the upper limit of offsite radiological consequences from any process operation at SRP. In the approximately 30 years of operation of SRP reactors, there never has been a release of radioactivity that resulted in offsite doses that exceeded applicable Federal guidelines. The EIS addresses and references accident releases related to reactor operation in Section 4.2.1.2 and Appendix G. Most tritium release incidents at SRP were not related to L-Reactor operation or its support facilities but to other facilities not in the scope of this EIS.

⁴October 4, 1983 letter from Ernest S. Chaput of DOE to Environmentalists, Inc. regarding its Freedom of Information request, FOI-SR-49.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AB-11	There is no explanation in the Draft EIS of why reports on SRP accidents and routine releases were not chosen as information sources. The Safety System Section as well as other presentations in the Draft EIS lack evidence regarding studies of SRP workers, such as those related to the approximately 400 employees whose urine tests showed that they had the radioactive substance plutonium in their bodies.⁵	The estimates of radioactive releases to the environment resulting from L-Reactor startup and operation under normal operating and accident conditions are, to the extent possible, based on actual SRP operating experience, as documented in the reports cited as references in the EIS. (See EIS, Volume 1, Section 4.1.2; Volume 2, Appendix G.) Exposures of SRP workers to internal and external radiation are carefully monitored and controlled through a health physics program designed to maintain occupational doses "as low as reasonably achievable" (ALARA), as outlined by the U.S. Department of Energy in DOE 5480.1A, <u>Environmental Protection, Safety, and Health Protection Program for DOE Operations</u>. Occupational doses at SRP to date have been well below the DOE limits of 5 rem per year to an individual. Furthermore, occupational doses associated with reactor operations have decreased from an average of 200 person-rem per reactor-year during the period from 1960 through 1968 to an average of 69 person-rem per reactor-year during the period from 1976 through 1980 as a result of the ALARA operating philosophy. Of the 411 production workers who have shown positive evidence of assimilation of transuranic elements (through October 1983), including plutonium, only 6 have exceeded 50 percent of a Maximum Permissible Body Burden (MPBB), as defined by the International Commission on Radiological Protection ("Report of ICRP Committee II on Permissible Dose for Internal Radiation," Health Physics, Volume 3, 1960). The maximum individual assimilation was 90 percent of MPBB. During the entire operation of SRP, only one worker has exceeded the occupational exposure limit of 5 rem per year. No biological effects are expected from exposures of this magnitude. An ongoing health study of SRP workers has shown no evidence of unusual health effects that could be attributed to radiation exposure.

⁵In 1974, Du Pont's supervisor of the Works Technical Department at SRP publicly admitted that employees had been misled about the health effects of plutonium. Allendale County Citizen, Nov. 27, 1974.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AB-12	I found no discussion of why theoretical reports, such as the BEIR III report, were chosen in preference to evidence directly related to the SRP. When the BEIR report and other general type references were used in the Draft EIS, the preparers failed to identify the pages in them which contained the specific information connected to the text.	The preparers used the BEIR III report as a basis for establishing a relationship between radiological doses calculated in the EIS and any resulting health effects in terms of excess cancer fatalities. Estimates of radiation health effects presented in the BEIR III report are based on the observed incidence of cancer-induced fatalities that resulted from exposure to high radiation levels. This data base included information derived from studies of Japanese survivors of the atomic bombs dropped on Nagasaki and Hiroshima, and from medical procedures that result in high radiation doses. The basic problem addressed in the BEIR III report was how to extrapolate from health effects observed at high levels of radiation to estimates of health effects that might be associated with very low levels of radiation, such as those resulting from L-Reactor operation. The BEIR III report in this sense is largely a statistical study of empirical data, rather than a theoretical report. The BEIR III report was selected for use in deriving the health effects reported in the EIS in preference to evidence directly related to SRP because there have been no observable health effects resulting from SRP operations, in terms of excess cancer fatalities, that can be quantified or identified. Specific page references in BEIR III are not cited in the EIS because the evaluation of health-effects estimators requires a careful review of the entire BEIR III report and an assessment of the alternative approaches presented in relation to the problem of extrapolating high-radiation-level health effects to low-radiation levels.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>COOLING-WATER ALTERNATIVES</u>		
AB-13	Despite recognizing that the discharge of hot water from the L-Reactor would cause environmental damage and despite the fact that this thermal pollution violates the water quality regulations of South Carolina, those preparing the Draft EIS appear to favor the direct discharge to Steel Creek since they have identified this as the "reference case," on page 4-81. It is unclear just what "benefits" are being balanced against destruction of swampland and non-compliance with South Carolina's regulations. The lack of adequate and specific documentation regarding cooling alternatives contributes to the presentation of misleading information.	Section 4.1 of the EIS describes the impacts that would result from the direct discharge of L-Reactor cooling water to Steel Creek, and Section 4.4.2 describes over 30 potential cooling-water mitigation alternatives. In accordance with the Council on Environmental Quality's regulations implementing the procedural provisions of NEPA, this final EIS identifies and discusses the Department of Energy's preferred cooling-water alternative, which is to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in the lake. Also, see the responses to comments AA-1 and AB-4 regarding cooling-water mitigation alternatives and the balancing of "cost vs. benefits." <i>Specific information in Section 4.4.2 and Appendix I of the EIS is provided on cooling-water alternatives. The EIS includes the following topics for each of the cooling-water mitigation alternatives considered:</i> - o Capital and operating costs - o Schedule - o Estimated number of construction personnel - o Production efficiency - o Conceptual designs, location, areal extent, and requirements for rerouting plant services and roads - o Thermal effects at several locations in Steel Creek - o Wetland and upland habitat eliminated - o Rate of delta growth - o Cooling withdrawal rate from the Savannah River and resulting entrainment and impingement losses - o Impacts to endangered species - o Potential impacts to historic/archeological sites - o Release and remobilization of radionuclides - o Thermal discharge standards.
AB-14	For example, the mistaken impression is given that Savannah River operations have had little or no effect on reducing the diversity of species, a situation known to reduce the biological stability of an area. On page 4-18, the statement is made that "no major changes in the presence of species have occurred from past Savannah River operations at their stations (7	Section 4.1.1.4 describes the effects of direct discharge of cooling water from L-Reactor on species diversity; these effects concur with findings published by Parker, Hirschfeld, and Gibbons (1973).

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	studies by researchers with the Academy of Natural Sciences of Philadelphia-ANSP) or are expected to occur from the addition of heat and cooling water from the L-Reactor." This statement conflicts with the findings of a 1971 survey by Parker, Hirshfield and Gibbons. According to this study, only 8 plant, 5 fish and 2 reptile species remain in the heated area of Pond C whereas the unheated portions of Par Pond has 34 species of aquatic plants, 23 species of fish and 9 species of reptiles.⁶ One of the 1971 report's researchers, J. Whitfield, co-authored an article with Rebecca Sharitz which summarizes the research of numerous investigators at the Savannah River Ecology Laboratory over a five year period.⁶ The Draft EIS includes this study, "Thermal Alteration of Aquatic Ecosystems" as a reference for Volume 1 (pages 3-70 and 4-144) and Volume 2 (page C-80).	The studies by ANSP were conducted on the Savannah River. The studies by Parker, Hirshfield, and Gibbons were conducted on Par Pond. Because these are two different systems, there is no conflict in the results and conclusions of the different studies.
AB-15	It is important that the Final EIS resolve the problem of conflicting and misleading information on the subject of thermal pollution. Another lesson to be learned from the Gibbons-Sharitz report is that a study which clearly identifies its references is much easier to understand and review. We recommend that a similar type of documentation be used in the Final EIS. <u>ENVIRONMENTAL IMPACTS</u> More time is needed to review sections of the Draft EIS related to such areas of inquiry as radioactive releases, equipment failures, seepage basins, accidents, worker exposures, etc., before specific and detailed comments can be prepared. The following failures, however, have been identified:	See the responses to comments AB-13 and AB-14 regarding data on thermal discharge contained in the EIS. Also see the response to comment AB-6 regarding EIS references.
AB-16	1. Failure to use a method of identifying reference materials so that a connection is made between the text and the passage in the particular document(s) which support statements and conclusions in the EIS.	See the response to comment AB-6 regarding EIS references.
	⁶Gibbons, J. W. and R. R. Sharitz, 1974. "Thermal Alteration of Aquatic Ecosystems," <u>American Scientist</u>, Vol. 62, page 663.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AB-17	2. Preparing dose estimates without adequate consideration for the detrimental effects which people of the area have experienced as a result of the radioactive gases and fallout which have originated from the complex of nuclear facilities at the SRP over the past 25 years or more.	The intent of the EIS is to address the environmental impacts associated with L-Reactor restart and operation as required under NEPA. Concentrations of radioactivity in air, water, and soil in the region due to releases from SRP in the past are measured as part of the annual environmental monitoring program. These concentrations, along with the doses to maximally exposed individuals and the general population offsite due to SRP radioactive releases to the environment, are reported in the annual SRP environmental monitoring reports. The resulting doses are well within established limits and represent a very small fraction of background radiation doses. No detrimental effects due to SRP radioactive releases have been observed, and analyses indicate none should be expected beyond those reported in the EIS for L-Reactor restart and operation.
AB-18	3. Failure to adequately identify the routine releases of K-85, tritium and Carbon-14 which have been discharged from reprocessing plants and the added amount due to the proposed operation of the L-Reactor.	Routine releases of K-85, tritium, and C-14 due to the proposed operation of L-Reactor, including those associated with facilities that support L-Reactor operation, such as the separations facilities, are reported in the EIS (See Volume 1, Sections 4.1.2 and 5.1.2).
AB-19	4. Failure to provide data collected from studies of SRP workers.	See the response to comment AB-11 regarding data from studies of SRP workers.
	<u>CONCLUSION</u>	
AB-20	Lawrence Benedict, in his testimony of August 5, 1983, stated that the Georgia Conservancy and Citizen's for a Clean Environment were concerned about the possibility that the NUS Corporation might work on the EIS related to the proposed restart of the L-Reactor. He pointed out that the NUS Corporation had prepared the Finding of No Significant Impact and the "flawed" Environmental Assessment.	Judge Jackson of the United States District Court for the District of Columbia, in his Summary Judgment decision on July 15, 1983, found "that document, submitted by the contractor to DOE in May 1982, in draft and revised, constituted the basis for DOE's finding of no significant impact; 47 Fed. Reg. 35, 691, on August 23, 1982 . . . The Court finds the conclusion (the finding of no significant impact prepared by DOE) alone to be arbitrary and an abuse of discretion . . . the antecedent studies appear to be both candid and thorough, and as to DOE itself evince the hard look at environmental consequences required of it."

⁷Draft EIS, Volume 2, page K-56.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Since the Finding of No Significant Impact was denounced by a U.S. District Court Judge as "unreasonable, arbitrary and an abuse of discretion," it is unclear why the NUS Corporation was chosen to prepare the Environmental Impact Statement.	The Decision went on to say "DOE's own environmental homework reflected in and represented primarily by its Environmental Assessment, provides extensive information on the anticipated consequences of the resumption of L-Reactor's operations. Plaintiffs do not object to any paucity of data so much as they do to the fact that, once published with its finding of no significant impact, the EA ends the process . . . " As a point of clarification, DOE contracted with NUS Corporation to assist in the preparation of the Environmental Assessment - L-Reactor Operation, Savannah River Plant (DOE/EA-0195). The EA is a DOE document prepared under DOE guidance, direction, and review. DOE determined its content and approach. The Finding of No Significant Impact on the resumption of L-Reactor operation was a DOE decision document prepared solely by DOE personnel. NUS Corporation played no part in this decision process.
	Please send copies of our Preliminary Comments to the preparers of the Draft EIS, whose names are listed on pages LP-2 through LP-14 in Vol. 2.	
AB-21	On behalf of Environmentalists, Inc., I request that a discussion meeting be arranged as soon as possible between consultants with NUS Corporation, State/Federal officials and representatives of commenting organizations, including Environmentalists, Inc. The purpose of the Meeting would be to address the defects of the Draft EIS which if repeated in the Final EIS would prevent the document from being in compliance with the National Environmental Policy Act.	As contained in DOE's letter to Ms. Thomas of October 21, representatives of DOE were available at the public hearings on the Draft EIS during the week of October 31, 1983 to discuss any questions following the hearing sessions. Also see the response to comment AB-1 regarding the requirements for consultations with the States of South Carolina and Georgia and the receipt of comments on the Draft EIS.
	Sincerely, Ruth Thomas, Authorized Representative Environmentalists, Inc. 1339 Sinkler Road Columbia, SC 29206 Tel. 803- 782-3000	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF ROBERT F. BURNETT		
UNITED STATES NUCLEAR REGULATORY COMMISSION Washington, DC 20555		
October 11, 1983		
Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P. O. Box A Aiken, South Carolina 29801		
Dear Mr. Sires:		
We have reviewed the draft Environmental Impact Statement for the Savannah River Plant and from a safeguards perspective, have no comments.		
Sincerely,		
George W. McCershing for, Robert F. Burnett, Director Division of Safeguards Office of Nuclear Material Safety and Safeguards		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF DAVID G. JENNINGS		
<u>Woodstorks and the L-Reactor: An Evaluation of the Draft EIS</u>		
<u>Introduction</u>		
AD-1	In the draft Environmental Impact Statement for the startup of the L-Reactor, the Savannah River Plant (SRP) wetlands are mentioned as important feeding sites for a nearby colony of endangered American Woodstorks. No discussion follows of the impact of removing a large percentage of these wetlands (due to thermal pollution of Steel Creek) from use as foraging areas for the Woodstorks. It is my feeling that the wetlands of the Savannah River Plant, including Steel Creek, should be considered critical habitat for the American Woodstork. By critical habitat it is meant that, without these wetlands as a major foraging area, there is a strong possibility that the Birdsville Woodstork Rookery would fail due to lack of a sufficient food base.	Appendix C, Section C.3.2 of this EIS presents more detailed information than was available for the preparation of the draft EIS. According to the U.S. Fish and Wildlife Service, critical habitat is presently considered neither prudent nor determinable for the breeding population of the wood stork in the United States. The basis for this determination is given in 48FR 8403. Critical habitat means (1) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with Section 4 of the Endangered Species Act, on which are found those physical or biological features (i) essential to the conservation of the species and (ii) which may require special management considerations or protection, and (2) specific areas outside the geographical area occupied by a species at the time it is listed in accordance with the provisions of Section 4 of the Endangered Species Act upon a determination by the Secretary of the Interior that such areas are essential for the conservation of the species (44 FR 47863). Based on existing data, there is no conclusive evidence that the loss of observed wood stork foraging sites in the Steel Creek delta would result in the failure of the Birdsville colony. Prior to the fledging of the 1983 season young of the Birdsville rookery, 64 percent of the observed instances of foraging occurred on the SRP. Thirty-three percent occurred at two sites near Beaver Dam Creek, which is affected by SRP powerhouse operations. The remaining 31 percent of the observed instances of foraging at seven sites occurred at Beaver Dam Creek (11 percent), the Steel Creek delta (14 percent), and Pen Branch (6 percent). These seven sites are not available during periods of plant operations, such as cold-water testing of the L-Reactor. Observed instances of pre fledging foraging off the SRP from 18 foraging sites accounted for 36 percent of the total.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AD-2	this rookery failed to produce young in 1981--probably due to a drought reducing the number of wetlands available. This suggests that adequate foraging sites may be the limiting factor for the colony. If so, the destruction or alteration of what appears to be the best available feeding areas could preclude the future success of this colony.	Nestling abandonment by wood storks in Florida has been associated with periods of high water or extreme drought (Kushlan et al., 1975). The reproductive success of the wood stork is affected by the number of fish per area of wetlands (i.e., the density of prey organisms) or by severe drought that reduces both habitat and food availability (Ogden and Patty, 1981). Storks of the Birdsville rookery abandoned their nestlings at approximately 3 to 4 weeks of age during 1981. The drought at that time is assumed to be responsible for the abandonment at the Birdsville colony. Foraging sites in the Savannah River swamp system at the SRP ranked statistically higher than other sites in a comparison of the mean number of storks observed at all SRP sites (29.8) with those observed at other sites (8.4) before fledging. This comparison used only those sites identified before fledging. After fledging, juveniles were recorded with adults at foraging sites not located at SRP. Juveniles did not use SRP foraging sites.
AD-3	It should be stressed at the outset that all questions and tentative conclusions in this report can be drawn from data presented in the draft Environmental Impact Statement (DEIS), statements (such as the flushing of cold water through Steel Creek) from the Environmental Assessment, and other public documents. More data needs to be gathered--or released if it has already been gathered--in order to make an intelligent decision of the issue.	Listing of the wood stork as an endangered species occurred February 28, 1984, after the Draft EIS for L-Reactor was completed. Beginning in April 1983, studies on the wood stork were initiated. The design of the wood stork study program and preliminary results of the program were provided to the FWS during an informal consultation process. Data from the wood stork program has been included in this Final EIS in Appendix C, Section C.3.2. A biological assessment for the wood stork was formally transmitted to the FWS at the end of March 1984. The Department is currently awaiting the review of this assessment by the FWS. The Department anticipates that as a result of the FWS review, the FWS will concur in the Department's conclusion that while operation of L-Reactor might affect portions of the wood stork's SRP foraging habitat, operation of L-Reactor and other ongoing and planned operations will not affect the continued existence of this species.

David G. Jennings

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Situation: Woodstorks using the Savannah River Plant (and Steel Creek in particular).	
	Problem: Woodstorks are now or will soon be listed as an endangered species. Will the startup of the L-Reactor have a significant (and negative) impact on the local population of Woodstorks?	
	Answer: UNKNOWN. But, predictions can be made based on data gathered for the required Environmental Impact Statement.	
Questions and considerations that may reveal how important (or unimportant) the Savannah River Plant (SRP) swamps are to the Birdsville Woodstork Rookery include:		
AD-4	1. Is the average distance to a non-SRP feeding site about the same as to the SRP swamps (45 km)--or are the storks traveling significantly further to the SRP sites? Distance traveled could be an indication of the quality and importance of the feeding site. If the birds are traveling long distances to SRP, in contrast to short distances for alternate off-plant feeding sites, it seems clear that the SRP wetlands are considered a high quality area by the Woodstorks.	The average distance to sites is not necessarily correlated with the importance of the foraging site to the wood stork. Storks travel to sites with available food. At the Birdsville colony, storks travelled an average of 22.8 kilometers before the fledging of young and 25.0 kilometers after the fledging of young. This difference was not statistically significant. Wood storks did not travel farther to feed as the breeding season progressed. It is hypothesized that the elevation of feeding sites (from 30 to 100 meters above mean sea level) and the drought controlled how far the Birdsville storks travelled to feed. That is, foraging sites at higher elevations become unavailable before foraging sites at lower elevations. The wood storks travelled to the higher sites first no matter what the distance from the colony (up to 60 kilometers) and then to lower sites. Low water levels and concentrated fish are probably the principal reason that wood storks forage in the Savannah River swamp wetlands on the SRP. Preferred feeding sites will probably be used as long as they are within the 50- to 60-kilometer daily radius from the wood stork colony.
AD-5	2. Comparison of the average number of Woodstorks seen feeding at a SRP feeding site vs. the average number seen at off-plant sites. If there is a significant difference (DEIS, C-37; 26.4 individuals vs. 6.6) this may also be an indication of the value of the SRP swamps to the local Woodstork population.	See the responses to comments AD-1 and AD-2 regarding the use of wetlands and Steel Creek as foraging sites.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AD-6	3. Availability (species and numbers of individuals) of prey items in the Steel Creek sites as compared to off-plant sites. If prey items are more abundant, importance of the site as a foraging area should be recognized.	Data on fish are presented in Section 3.6 and Appendix C of the EIS, and will also be presented in the biological assessment submitted to the U.S. Fish and Wildlife Service.
AD-7	4. Total number of Woodstorks using SRP wetlands on any single day. The Draft EIS (DEIS, page C-38) shows 147 individuals using SRP on July 14. One hundred forty seven out of 238 total breeding adults in the rookery is over 60% of the population. Were anywhere near this number seen at any off-plant feeding site?	Ten, 63, and 74 adult wood storks (a total of 147) were recorded feeding at sites 013, 022, and 024, respectively, in swamps near Beaver Dam Creek on July 13, 1983. Site 025, 7.5 kilometers west of the Birdsville colony, had approximately 30 adult wood storks feeding on July 27, 1983. Therefore, approximately twice as many adult wood storks were recorded foraging at site 024 at Beaver Dam Creek on the SRP than the highest number of adult wood storks recorded at off-plant foraging sites.
AD-8	5. Long term (but within a single season) availability of the site for foraging. Many off-plant sites are probably small temporary wetlands that can only be utilized by Woodstorks for a short period of time before drying up. The SRP wetlands and creeks, however, retain a base flow of water throughout the summer making them a dependable foraging area for the entire breeding period.	Most non-SRP foraging sites were dry shortly (1 to 2 weeks) after wood storks were initially observed at these foraging sites. Two of nine SRP foraging sites at Beaver Dam Creek were dry by mid-August 1983. Seven other SRP foraging sites were temporarily lost when plant operations caused water depths to exceed 32 cm.
AD-9	6. Fledgling success rate of this colony¹ in contrast to published fledgling rates for Florida populations. If the Birdsville colony is able to produce young at a higher than normal rate then, recognizing that this is an endangered species, it should not be disturbed--nor should its food base be disrupted.	The mean number of young wood storks per nest in the Birdsville rookery ranged from zero in 1981 to 2.19 in 1983. In highly successful years, such as 1983, the Birdsville rookery has produced more wood storks than colonies of a similar size in southern Florida (the mean equals 0.7 young per nest).

¹Unknown, not included in the DEIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AD-10	7. Predicted future land use patterns and their effect on the non-SRP sites. Most of the non-SRP areas used by the Birdsville Woodstork Rookery probably occur on private lands. These sites may be in danger of conversion into agricultural lands over the next decade or so. The SRP swamps, on the other hand, are part of the buffer area around the reactors and should not be affected by changing land use patterns.	The cypress swamp surrounding the Birdsville rookery is privately owned. At present, the Georgia Department of Natural Resources leases the land and patrols the rookery. The ownership and future land use of all habitats used by wood storks of the Birdsville rookery is unknown. However, some habitats will probably be lost due to agricultural or other land-use practices. The SRP does provide isolation and protection from disturbances by the public.
<u>Additional Questions Generated by Study of the Draft EIS</u>		
AD-11	1. Why were no Woodstorks recorded using the Steel Creek area after July 12? Had the colony dispersed or were cold water releases (as mentioned in the Environmental Assessment as being SOP for the reactor on its "standby" status) responsible for the Woodstorks absence? If raised water levels were created artificially this suggests a strong bias in the data in terms of the actual amount of usage that Steel Creek might have received without the raised water levels. If this is the case, why weren't the fluctuating water levels mentioned in the DEIS as a possible source of bias in the data?	After July 12, 1983, it is hypothesized that wood storks were absent from the Steel Creek delta because of high water. On July 12, 1983, or soon thereafter, the water depth at site 012 in the Steel Creek delta increased to 48 centimeters (from 18 centimeters) due to reactor operations and testing (K- and L-Reactors). Depths at site 012 remained between 44 and 48 centimeters through September 1983. Wood storks abandoned feeding sites at Steel Creek during periods of high water. During these high-water-level conditions, fish that were originally concentrated in shallow pools dispersed from the Steel Creek delta. This condition is taken into consideration in calculating frequencies of foraging (Appendix C, Table C-9). Thus the data are not biased. Variations in water levels are also discussed in the FEIS.
AD-12	2. On page 3-52 of the DEIS it says that the SRP wetlands appear to be important <u>post breeding</u> feeding habitat. Table C-7 shows heavy usage of SRP swamps during June and July. Page C-37 states that birds were nesting in July of 1980. On what data was the "post breeding" conclusion drawn?	The statement in Section 3.6.1.4 of the Draft EIS that "the Steel Creek delta and Beaver Dam Creek appear to represent important feeding habitat for post-breeding wood storks from the rookery" is incorrect. The word "post-breeding" has been deleted.
¹Woodstorks require areas with lowered water levels, where their prey (fish) have been concentrated. By adding water to Steel Creek, the water levels may have been raised to too high a level for Woodstorks to forage successfully.		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses										
AD-13	3. On page C-37 it states that a total of 386 Woodstorks were seen on SRP wetlands in the summer of 1983, but in Table C-7 a total of 394 birds are listed as being counted on the SRP swamps in the three week period June 23-July 14. What was the total number of Woodstorks seen on SRP in the summer of 1983? Would the number of Woodstorks seen on Steel Creek have been higher if the water level had not been manipulated (assuming for the moment that it was)?	A total of 478 observations of wood storks was recorded on the SRP from June 21 to September 29, 1983, using ground and aerial surveys. This total includes individuals that were observed before and after fledging. Of this total, 66 percent occurred in the Beaver Dam Creek swamp, 21 percent occurred in the Steel Creek delta, and 13 percent occurred in Pen Branch and Four Mile Creek swamp areas. Wood storks were also followed to foraging sites from the Birdsville rookery. Of the 740 observed instances of foraging, 64 percent occurred in non-SRP areas. Of the 36 percent of the observations on the SRP, 22 percent occurred in Beaver Dam Creek, 11 percent occurred in the Steel Creek delta, and 3 percent occurred north of Pen Branch delta. These data have been included in Appendix C of this EIS and will be included in the biological assessment and consultation process with the U.S. Fish and Wildlife Service. Also see the response to comment AD-11 regarding the number of wood storks and water levels.										
AD-14	4. Was the low number of Woodstorks seen using the SRP wetlands during 1981 and 1982 due to low numbers of these birds using the area or was it due to the lack of an intensive daily search for Woodstorks.	No aerial surveys were conducted for wood storks during 1981 and 1982. The low numbers of storks observed might be related to the survey methods, which were limited to ground surveys (mostly at Steel Creek) at selected areas in the Savannah River swamp system on the SRP.										
AD-15	5. Is it possible that the observed number of Woodstorks seen using the SRP swamps in 1983 is a minimum number, due to variation in the timing of surveys? For instance, if a feeding site is surveyed early in the morning it may show fewer birds than a similar survey conducted in the early afternoon--after thermals ¹ have had a chance to develop.	Aerial surveys were conducted for wood storks at SRP between 9:00 a.m. and 8:00 p.m. (one exception was 7:45 a.m. on July 30, 1983, in which three wood storks were recorded) until the Birdsville colony dispersed on August 25, 1983. After the colony dispersed, aerial surveys of the Savannah River swamp system were conducted between 8:30 and 9:30 a.m. (one exception was 6:00 p.m. on September 6, 1983) until September 29, 1983. The time distribution of SRP aerial surveys before the Birdsville colony dispersed was as follows: <table><tr><th>Time of survey</th><th>Percent of surveys</th></tr><tr><td>9:01 a.m. - 12:00 noon</td><td>32</td></tr><tr><td>12:01 p.m. - 3:00 p.m.</td><td>24</td></tr><tr><td>3:01 p.m. - 6:00 p.m.</td><td>40</td></tr><tr><td>6:01 p.m. - 9:00 p.m.</td><td>4</td></tr></table>	Time of survey	Percent of surveys	9:01 a.m. - 12:00 noon	32	12:01 p.m. - 3:00 p.m.	24	3:01 p.m. - 6:00 p.m.	40	6:01 p.m. - 9:00 p.m.	4
Time of survey	Percent of surveys											
9:01 a.m. - 12:00 noon	32											
12:01 p.m. - 3:00 p.m.	24											
3:01 p.m. - 6:00 p.m.	40											
6:01 p.m. - 9:00 p.m.	4											

¹Woodstorks, like other soaring birds, use thermals (columns of heated rising air) to make it easier to travel long distances. Thermals do not normally develop until mid to late morning.

¹Woodstorks, like other soaring birds, use thermals (columns of heated rising air) to make it easier to travel long distances. Thermals do not normally develop until mid to late morning.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AD-16	<u>Attributes of the Birdsville Woodstork Rookery which make its individuals more valuable than a comparable number of nesting Woodstorks from a Florida colony:</u>	The Birdsville rookery was established in 1980 and perhaps as early as 1977. This colony is not recognized as a subspecies of the wood stork. Because wood storks do not breed until they are 4 years old, the adults of this colony probably originated in Florida. If this population is reproductively segregated from Florida colonies, genetic differences might become apparent in the future; however, in 1983 the adult wood storks from Birdsville can be assumed to be genetically similar to storks at the center of their population in Florida.
	1. The colony plays an important role in maintaining diversity of the species' gene pool. Congress has recognized that preservation of the world's genetic diversity is an important goal. Preservation of the diversity within a species is also recognized as necessary. The Birdsville rookery is the northernmost colony of Woodstorks in the world. It is a generally accepted fact that populations on the edges of a species' geographic range often contain different genes--or at least different gene frequencies--than similar populations in the center of their range.	
AD-17	2. There is a definite value in having scattered breeding colonies of a rare species to minimize the impact of a local catastrophe (such as a hurricane wiping out the wintering Whooping Cranes, or a prolonged drought in Florida disrupting breeding of the Florida populations of Woodstorks.	The wood stork colony at Birdsville, Georgia, is 167 kilometers north of the next active stork colony and 140 kilometers inland. Local catastrophes such as hurricanes, tornadoes, and severe thunderstorms can destroy nestlings and eggs during the breeding season. Scattered rather than localized breeding colonies of wood storks will reduce stork mortality due to natural catastrophes.

¹The Endangered Species Act covers protection of subspecies and local populations.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF JOHN C. SNEDECKER		
LYRIC, INC. John C. Snedeker, President 12 Wilmington Island Road Savannah GA 31410 912-897-4764		
4 November 1983		
US Department of Energy Savannah River Operations Office PO Box A Aiken, SC 29801		
Att: Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment		
Re: Draft Environmental Impact Statement DOE/EIS-01080, dated September 1983 "L-Reactor Operation---"		
Dear Mr. Sires:		
We welcome this opportunity to submit comments on the subject Draft EIS.		
We understand that the pertinent comments being solicited at this time pertain to the environmental consequences of the re- start of the L-Reactor, and that the need for the re-start has already been established. For the record, however, we feel that it is important to stress that the requirement to increase the output of weapons-grade plutonium and tritium was identi- fied in 1980 by the National Security Council (NSC) in the context of modernizing our defense systems; that the increased requirements were defined in the FY 1981-83 Nuclear Weapons Stockpile Memorandum (NWSM) approved by President Carter in October 1980; and re-affirmed in the FY 1983-88 NWSM approved by President Reagan in November 1982.		
We wish to commend the Department of Energy and all of the people who contributed to the Draft EIS for a very thorough and highly professional effort. It addresses all of the environ- mental concerns in depth, and provides a very adequate basis		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	for concluding that the re-start of the L-Reactor will not have an adverse effect on the environment beyond the parameters inherent in the operation of the Savannah River Plant as a whole. While we understand the desire of the editors of the EIS to cover all possible concerns that might be surfaced by people with a legitimate environmental interest (and that could include the entire population of the affected area), we are somewhat troubled by the inclusion of such detail about the plant operation itself. After all, the Savannah River Plant is a major defense installation, not a research facility, and there are many aspects of its operation that should be revealed only to those with a "need to know". The EIS, in our opinion, goes somewhat beyond that limit.	
M-45	AE-1 The radiological impacts, including assessments of the results of various accident scenarios, are obviously the principal concern of people in the affected areas. While the data is voluminous and reassuring, the summaries could have been presented in a more "up-front" manner for the lay reader. This is an editorial rather than a technical comment.	The Summary of the EIS has been revised in an attempt to provide a more readable summation for the lay reader. Thermal cogeneration as a cooling-water alternative is discussed in Section 4.4.2. of the DEIS. As discussed in Section 4.4.2, thermal cogeneration as a cooling-water mitigation alternative for L-Reactor is not considered economically or technically feasible at this time.
	AE-2 The non-radiological impacts are very thoroughly discussed, and are certainly acceptable on a cost/benefit basis. Having been trained as an engineer, we are conscious of the desirability of conservation of energy, and/or the use of waste energy wherever possible. The thermal energy discharged from the L-Reactor, and presumably from the other reactors as well, is tremendous. The thermal effect on the Steel Creek drainage basin appears to be the major non-radiological impact, and one that cannot be mitigated within the time-frame of the re-start mandate. The localized scope of the impact is acceptable on a cost/benefit basis, but it should be possible to develop productive uses for the thermal energy. Co-generation is mentioned in the EIS as one way of mitigating the thermal impact in time. We would urge the DOE to explore such ways of using the thermal energy in an economically efficient manner. This suggestion is made on a long term basis, and not as a constraint on the approval of the EIS.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	In summary, we feel that the environmental impacts of the re-start of the L-Reactor have been very adequately assessed, and that the data does not indicate any unacceptable or potentially dangerous conditions arising from its operation. We sincerely hope that the Draft EIS will be approved expeditiously, and that the present legal and legislative constraints on the re-start of the L-Reactor will be removed in an equally expeditious manner. Very truly yours, John C. Snedeker President of LYRIC, INC., Savannah-based management consultants specializing in the aerospace, defense, and high technology industries.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF J. KELLY NELSON, JR.		
J. Kelly Nelson, Jr. Real Estate Appraisal Co. 1940 Blossom St. Columbia, SC 29205		
YOU DON'T HAVE TO BE AN "EXPERT" TO PLAY A MEANINGFUL ROLE IN THE EIS PROCESS. A valuable contribution at this point would be a letter demanding that:		
1. DOE facilities be required to comply with federal and state environmental standards applicable to commercial reactor sites;		
and		
2. Steps be taken to avoid damage to the environment before startup.		
We urge you to write such a letter to DOE. If you have questions about the hearings, the draft EIS, or the L-Reactor, call me at 803-256-7298. YOUR INVOLVEMENT IS IMPORTANT.		
I request that:		
AF-1	1. DOE facilities be required to comply with federal and state environmental standards applicable to commercial reactor sites; and	As stated in response to comment AA-3, the restart of L-Reactor will be in compliance with all applicable Federal and state environmental protection requirements. Further, restart of L-Reactor will meet DOE radiation protection standards that are comparable to those of the Nuclear Regulatory Commission (10 CFR 20) for a production facility (i.e., 500 millirems to the whole body in any one calendar year).
The need for specific engineered safety features for nuclear reactors varies according to the design and operating differences that exist between different types of reactors. Commercial light-water nuclear reactors that have containment domes, for example, have coolant conditions that are at high-pressure (over 2000 pounds per square inch) and at high temperatures (greater than 500°F). L-Reactor, which is used to		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AF-2	2. Steps be taken to avoid damage to the environment before startup.	produce defense nuclear materials, is of a different design than commercial light-water nuclear reactors; its coolant conditions are at considerably reduced pressure (5 pounds per square inch) and temperature (212°F). The differences that exist between different types of reactors is illustrated by the the Fort Saint Vrain gas-cooled reactor in Colorado, which has no containment dome and was licensed by the NRC. DOE will take all reasonable steps to mitigate the impacts from L-Reactor operation while meeting its mandate to produce nuclear materials. Compliance with the applicable Federal and state environmental protection requirements will ensure that appropriate mitigative actions are taken. In addition, the Department of Energy is cooperating with the Fish and Wildlife Service to develop a Habitat Evaluation Procedure (HEP) plan for the Steel Creek system with the implementation of the preferred thermal mitigation system for L-Reactor. The HEP will identify the value of habitat to be gained or lost with implementation of the preferred L-Reactor cooling-water alternative for use in assessing further mitigation. If required, DOE will implement additional mitigative measures that might be identified through the HEP process dependent on Congressional authorization and appropriation. Also see the response to comment AA-3 regarding compliance with applicable Federal and state environmental protection regulations.
	Please don't do anything to endanger lives or environment!	
	Don't sacrifice S.C. and GA. for the "good" of others--How about in New England, they would complain too much.	
	I believe in arming the U.S. to keep Russia in its place, but not at the expense of lives, when we can do it correctly. (can do it safely)	
	Should have invaded after WW II.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MRS. ELLEN G. S. SPIRES		
10-19-83		
Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801		
ATTN: EIS for L-Reactor		
Dear Sir:		
M-49 AG-1	My name is Ellen G. Sires. I live in Swansea, S.C. off RD 9. I am 22 years old. I have two children and a wonderful husband. At first I wasn't sure I should even write, thinking in terms of it happening anyway, no matter what I or anyone else does. But then I thought about my first husband James A. Sires. We were married 3 years. He worked at SRP about 2 of these years. He started feeling tired and weak in the last part of May-1980. By June 12th, the doctor told me he had cancer of an unknown origin. He died Sept. 17, 1980. He had turned 24 Sept. 12, 1980.	James A. Sires worked as a carpenter for Du Pont Construction at SRP from December 1977 to February 1979 and from March 1980 to September 1980. He also worked for another construction firm at SRP from March 1979 to May 1979. He had no known exposure to suspect carcinogenic agents during his Du Pont service and had a total measured radiation exposure that was less than natural background radiation. It has not been possible to assign any initiating cause for his cancer, but available evidence makes it highly unlikely that it was work-related.
AG-2	You probably already think you know what I'm thinking and you're right. It really bothers me that the "L-Reactor is going to be started up again." The main reason I am writing this letter is to demand that DOE facilities be required to comply with federal and state environmental standards applicable to commercial reactor sites;	See the responses to comments AA-3 and AF-1 regarding DOE's commitment to comply with applicable Federal and state regulations and the differences between SRP reactors and commercial light-water reactors.
AG-3	and that steps be taken to avoid damage to the environment <u>before</u> startup; because what can you do when it's been done? Doesn't anyone care?	See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state regulations and to take all reasonable steps to mitigate impacts.
Mrs. Ellen G. S. Spires Rt. 2, Box 83-AA Swansea, SC 29160		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MARY LIRA AND WITOLD KOSICKI		
	Mr. Melvin J. Sires, III U.S. DOE Savannah River Oper. Office Aiken, SC 29801 Dear Sir, Unless you can give substantive reasons to the contrary we demand that:	
AH-1	1. DOE facilities be required to comply with Federal and State environmental standards applicable to commercial reactor sites.	See the responses to comments AA-3 and AF-1 regarding DOE's commitment to comply with applicable Federal and state environmental regulations and the differences between SRP reactors and commercial light-water reactors.
AH-2	2. Steps be taken to avoid damage to the environment <u>before</u> startup of the facilities.	See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state environmental regulations and to take all reasonable steps to mitigate impacts.
	Thank you for your attention, and hopefully your cooperation. Mary Lira and Witold Kosicki 109 Ligustrum Lane Columbia, SC 29209	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MRS. JEAN MAY		
	935 Law Lane Mt. Pleasant, SC 29464 October 21, 1983	
	Mr. Melvin J. Sires III Assistant Mgr. for Health, Safety & Environment U.S. Department of Energy P. O. Box A Aiken, South Carolina 29801	
	Re: EIS for L-Reactor	
	Dear Sir:	
M-51 AI-1	I am distressed to hear the possible start-up of the Savannah River Reactor in a manner that may be harmful to many... me included. It is my feeling that not only will its operation be a violation of some South Carolina Laws; but the Federal Government appears to agree to a harmful operation THAT COULD BE AVOIDED.	See the responses to comments AA-1 and AA-3 regarding cooling-water mitigation alternatives and DOE's commitment to comply with applicable Federal and state environmental protection regulations.
AI-2	As I understand it, there would be a direct discharge of about 176,000 gallons PER MINUTE of scalding water; that perhaps involved would be flushing of RADIOACTIVE Cesium into the Savannah River.	See the responses to comments AA-1 and AA-2 regarding cooling-water mitigation alternatives and the relationship of radio-cesium and radiocobalt concentrations to EPA drinking-water standards.
AI-3	Please remember that the Savannah River is a source of drinking water for about 70,000 South Carolinians and Georgians down stream. TOXIC CHEMICAL LEAKAGE will be INCREASED in a freshwater that is source for much of the Southeast.	As noted in Sections 4.1.1.5, 4.1.2.4, 5.1.1.2, and 5.2.6 of the EIS, the operation of L-Reactor will have little impact on the quality (chemical and radiological constituents) of Savannah River water. Nonradioactive discharges will meet the requirements on an NPDES permit issued by the State of South Carolina; radioactive discharges will meet applicable radiation protection standards.
AI-4	Please remember we think some of the impacts ARE AVOIDABLE! We do not think the health of many residents should be sacrificed for Business...maybe mean LARGER PROFITS if safety steps are by-passed.	DOE fully agrees that the health of residents should not be sacrificed. DOE's health standards are consistent with industry requirements (see also the response to comment AA-3). The health and safety of employees and residents are and have always been a primary consideration in operating the Savannah River Plant.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

The Department of Energy is an agency of the U.S. Government and E. I. du Pont de Nemours and Company operates the SRP for DOE without fee.

Please consider these comments and AVOID steps that may be detrimental to the health of many.

Sincerely yours,

Mrs. Jean D. May

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF ROBERT H. DRIGGERS		
Under the Sun, Inc. P. O. Box 4486 Greenville, SC 29608 803/232-6715		
Oct. 22, 1983		
Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, SC 29801		
Dear Mr. Sires:		
I will not be able to attend any of the public hearings that have been scheduled on the startup of the L-Reactor, but I did want to express my concerns about the effect that it may have on the surrounding environment.		
AJ-1	It is my understanding that the L-Reactor will increase the load on existing seepage basins by about 33%. These basins are currently leaking toxic chemicals into the Tuscaloosa water aquifer and it seems very short-sighted to compound the existing problem rather than working to correct it.	The EIS provides extensive discussions of the ground-water regime at SRP (Section 3.4.2 and Appendix F) and of the potential impacts to ground waters from the operation of L-Reactor and its support facilities in Chapters 4 and 5. This final EIS has been modified to reflect the current wastewater discharges to seepage/settling basins and to more clearly define the incremental impact of the L-Reactor restart on groundwater. The incremental increase--"33 percent"--in discharges to seepage basins does not in and of itself reflect a substantial impact to groundwater. In early 1983, DOE announced the detection of chlorinated hydrocarbons (27 micrograms per liter) in two wells in the A-Area, which produce from the Tuscaloosa Formation. Subsequent investigations of this reported contamination (Geraghty & Miller, 1983) have concluded that this contamination of the Tuscaloosa Formation did not result from the vertical migration of chlorinated hydrocarbons through the clay units that overlie the Tuscaloosa. Investigations have concluded that the

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		chlorinated hydrocarbons entered these wells by migration from shallow groundwater through defects in the cement grout of at least one production well and down the well to the Tuscaloosa Formation. The chlorinated hydrocarbons are primarily confined to the Tertiary sediments above the base of the Congaree Formation. Remedial actions to prevent the migration of these contaminants into defective well casings will confine the contaminants to the Tertiary groundwater system. Recent analysis of samples of production and monitoring wells have not detected chlorinated hydrocarbons in the Tuscaloosa Formation above the limit of detection (1 ppb). The absence of the detection of the chlorinated hydrocarbons in the Tuscaloosa Formation evidences the effectiveness of the confining clay units that overlie the Tuscaloosa Formation. The incremental increase in discharge to the M-Area settling basin from the restart of L-Reactor is not expected to further contaminate the Tuscaloosa Formation. Groundwater protection measures at the M- and A-Areas will consist of a remedial action program to remove contaminants in the Tertiary groundwater, and the phaseout of the M-Area settling basin by April 1985. The L-Reactor incremental discharges to the M-Area settling basin are not hazardous except for low pH. The incremental discharges to the settling basin until April 1985 are expected to cause only a minor and localized increase in the concentrations of contaminants that are entering the Tertiary groundwater system. With the implementation of the remedial action program, consisting of recovery wells and an air stripper, this incremental increase will be intercepted and removed. The restart of L-Reactor would also result in radioactive discharges to the L-Area seepage basin that are not hazardous, and incremental radioactive discharges to the existing Separations Area (F- and H-Areas) seepage basins. The present discharges to the F- and H-Area seepage basins are non-hazardous except for frequent periods of low pH and infrequent discharges of hazardous levels of mercury to the H-Area seepage basins. In

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		addition, recent discharges to the H-area seepage basins have contained hazardous levels of chromium; however, these hazardous levels of chromium were primarily associated with the processing of radioactive waste in H-Area waste tanks and the processing of offsite fuel elements. The incremental increase to the F- and H-Area seepage basins due to L-Reactor operation is not expected to be hazardous except for low pH and occasional discharges of mercury to the H-Area seepage basins that will be less than 8.0 kilograms per year. The discharges to the L-, F-, and H-Area seepage basins are not expected to impact the Congaree and Tuscaloosa groundwaters. The green clay and the thick low permeability clay units at the base of the Congaree and upper Eilenton Formation will act as effective barriers to the downward migration of contaminants. Above the Congaree Formation, contaminants will migrate from the seepage basin to onsite streams. DOE plans to request fiscal year 1986 Congressional funding for an effluent treatment facility to process the wastewater discharge to the F- and H-Area seepage basins. This final EIS contains a new Section 6.1.6 which discusses the draft "SRP Groundwater Protection Implementation Plan." This plan was recently developed to examine strategies and schedules for sitewide mitigative actions required to protect the groundwaters beneath the SRP. This plan has been reviewed by EPA and the State of South Carolina and is currently being revised. The final plan will be the subject of a separate NEPA review.
AJ-2	I'm also very disturbed that the DOE would choose to ignore and violate state water quality regulations by discharging water in excess of the allowed temperature.	See the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives.
AJ-3	This seeming disregard for the quality of the environment that we all share is one which I can't understand or accept. We all have a responsibility to pass on to our children a safe and healthy place to live. I urge you to use your position of responsibility to work for the improvement of environmental quality instead of contributing to its decline.	The SRP is not only a site for the production of defense nuclear materials, but it is also a National Environmental Research Park providing a significant area of protection from uncontrolled influence. A forest management program was begun in 1952 that consisted of planting old fields with loblolly, slash and longleaf pines. By 1978, more than 100,000,000

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
Your decision in this matter will affect many people for generations to come. I hope you will think about them and have the courage to speak for their right to a healthy environment.	Sincerely, Robert H. Driggers	trees had been planted. The deer population on the SRP is one of the largest in the Southeast due to the protection afforded by SRP. <u>Additionally, species and vegetation enhancement programs have been undertaken on SRP.</u> DOE is spending more than \$50 million a year on environmental activities at SRP.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF FRED M. REESE, JR.		
October 21, 1983		
Mr. Melvin Sires, III U.S. Dept. of Energy Savannah River Operations Office P.O. Box A Aiken, SC 29801 Dear Mr. Sires:		
AK-1	As a South Carolinian, a patriotic American, a concerned world citizen, I write to express anger, hurt and disappointment for the callous way our environment safety is being compromised by the startup procedures presently underway for the SRP L-Reactor.	DOE has considered environmental safety extensively in L-Reactor restart preparations. Approximately 60 percent of the \$204 million spent on L-Reactor renovation went to improve safety and environmental controls. Also, about \$5 million has been spent to date on environmental analyses of the impact of the restart. Also see the response to comment AA-3 regarding DOE's commitment to comply with applicable Federal and state environmental protection regulations.
AK-2	It seems incredible to me that DOE policies are permitted to by-pass state and federal standards designed to represent public interest. It scares me to realize that "production schedule demands" can override conclusive evidence of need for further careful study of the environmental impact of L-Reactor start-up.	See the responses to comments AA-1 and AA-3 regarding issuance of an NPDES permit for thermal discharge and DOE's commitment to comply with applicable Federal and state regulations.
AK-3	It is a sad commentary on the democratic process when legitimate public concern and well documented violations of public policy can be put aside by DOE political imperatives. You are our best hope for requiring legitimate recognition of persistent concerns from area residents and all who care about a viable, safe and environmentally productive community. Please insist on consistent uniform standards for all agencies involved. For the sake of all of us.	DOE is following all provisions of the NEPA process.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Sincerely,	
	Fred M. Reese, Jr. 1732 Crestwood Columbia, SC	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MRS. R. W. WHISNANT		
October 21, 1983		
Dear Mr. Sires,		
I am against the proposed resumption of operations of the L-Reactor at the Savannah River Plant. This would be very harmful to our environment.		
AL-1	DOE facilities need to be required to comply with federal and state environmental standards that apply to commercial reactor sites.	See the responses to comments AA-3 and AF-1 regarding DOE's commitment to comply with applicable Federal and state environmental regulations and the differences between SRP reactors and commercial light-water reactors.
AL-2	Steps must be taken to avoid damage to our environment before startup.	See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state environmental regulations and to take all reasonable steps to mitigate impacts.
Sincerely,		
Mrs. R. W. Whisnant		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MRS. ZELDA NOLAND		
Mr. Melvin J. Sires III		
Dear Sirs:		
AM-1	I understand that Environmental experts in various fields of S.C. and other fields are now in the process of reviewing drafts of E.I.S. Hopefully they will assess alternatives and suggest the most desirable without regard to alleged Production Scheduling Demands.	The EIS describes two sets of alternatives--production alternatives in Chapter 2 and mitigation alternatives in Section 4.4. The Record of Decision on this final EIS will balance the possible gains from these alternatives against the losses that they entail in delaying or eliminating the plutonium production called for in the Nuclear Weapons Stockpile Memoranda signed by Presidents Carter and Reagan.
AM-2	If we don't insist that D.O.E. take these and all comments into account, if our experts recommendations remain unread and undefended in the appendix of the E.I.S., the progress we've made in forcing the Federal Government to take our interests and health and thoughts into account and to obey <u>their own laws</u> and <u>ours</u> will be called into question. I have worked for the environmentalist Energy Research Foundation and gotten several hundred names and their comments and letters too. I think every person should be vitally interested in this issue. I'm 68 years old and have a difficult time breathing all the fumes and smogs and etc. now.	The EIS and NEPA process are designed to ensure that all interested citizens can have input into the decision process.
AM-3		Estimates of atmospheric releases from L-Reactor and its support facilities are given in Sections 4.1.1.6, 4.1.2.1, and 5.1.2.2. These releases result in ambient air concentrations that fall within all applicable state and Federal guidelines.
AM-4	I feel that if we don't wake up and try to do something about all this impact on our air and land and waters and vegetation we will all be wiped off the face of the Earth by our own indifference and won't have to wait on the Communists to do it. I for one would like to see people more concerned about anything that harms Gods great world He loans us to use. I do hope you will consider all the things that were discussed and brought to the public's attention. Our fresh water sources are being polluted every day by plants and other industries and getting away with it. What good is a stiff fine if 10 years later we still have the pollutant in our water and food? Much of this impact is avoidable and we believe they should be avoided. Thank you for your attention.	See the response to comment AM-2 regarding the EIS and NEPA process.
AM-5		Unavoidable and irreversible impacts for the reference case and preferred alternative are considered in Chapter 8 of this EIS. Also see the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state regulations and to take all reasonable steps to mitigate impacts.

Sincerely,

Mrs. Zelda Noland

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

STATEMENT OF CATHERINE C. BRADSHAW

Mr. M. J. Sires, III:

I strongly oppose the proposed resumption of L-Reactor operation at the Savannah River Plant in Aiken, S.C. Please include my position in the response to the Draft EIS.

Comment noted.

Sincerely,

Catherine C. Bradshaw
206 Hurt St NE
Atlanta, GA 30307
(404) 524-4190

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MARY EMMA GLEFFE		
	Columbia, S.C. 29209 828 Byron Road Oct. 26, 1983	
	Mr. Melvin J. Sires III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801	
	Dear Sirs:	
AO-1	I am concerned about the Savannah River Plant reopening and pouring all that contaminated water in the streams. Please take some kind of measures to keep our water supply free of chemicals that is harmful to the fish and wildlife and us human beings. Please take measures to protect us.	Liquid nonradioactive releases from SRP operations are governed by a National Pollution Discharge Elimination System (NPDES) permit. This permit limits the nonradioactive releases to limits established by the EPA and State of South Carolina to protect the health and safety of the surrounding population. Wastewater discharges from the proposed L-Reactor restart are discussed in Sections 4.1.1.5 and 5.1.1.2 of the EIS. Radioactive liquid releases are governed by DOE radiation protection standards (DOE Order 5480.1A, Chapter 11) that are comparable to those of the Nuclear Regulatory Commission (10 CFR 20) for a production facility (i.e., 500 millirem to the whole body in any one calendar year). Sections 4.1.2, 5.1.2, and 5.2.6 of the EIS discuss liquid radioactive releases. Also see the response to comment AA-3 regarding DOE's commitment to comply with applicable federal and state environmental regulations.
	Sincerely, Mary Emma Gleffe	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF JANET T. ORSELLI		
	Radiation Awareness Box 81 Folly Beach, SC 29439 October 21, 1983	
	Mr. M. J. Sires, III Assistant Manager for Health Safety and Environment U.S. Department of Energy Savannah River Operations Office P. O. Box A Aiken, South Carolina 29801	
	Dear Mr. Sires:	
	COMMENTS ON THE L-REACTOR DRAFT ENVIRONMENTAL IMPACT STATEMENT	
AP-1	Our organization, Radiation Awareness, is very concerned about the numerous omissions, conflicting information and serious defects in the Draft Environmental Impact Statement (DEIS). From the outset, it is unclear to us why the NUS Corporation was chosen to prepare the DEIS, when their <u>Initial Finding of No Significant Impact</u> was denounced as defective and unreasonable by a U.S. District Court Judge.	See the response to comment AB-20 regarding the opinion of the United States District Court and the preparation of the <u>Finding of No Significant Impact</u> .
	<u>CUMULATIVE IMPACTS</u>	
AP-2	During the scoping process, numerous individuals and state and federal agencies requested that the DEIS provide information regarding the routine and accidental releases of radioactivity over the 25-30 year operation of the Savannah River Plant. This information is not provided nor even addressed in the DEIS. As we stated in our scoping letter, "without this vital information, it would be impossible to seriously evaluate the total, cumulative health effects of the L-Reactor restart" (K-97). This data must be made available in the Final EIS.	The purpose of the EIS is to evaluate the environmental consequences of the proposed restart of L-Reactor. Routine and accidental releases of radioactivity from past operations at SRP are covered in the references listed in Chapters 4 and 5. In particular, Appendix A of <u>Environmental Impact Statement, Waste Management Operations, Savannah River Plant (ERDA-1537)</u> contains tabulations of radionuclide releases from the startup of the SRP through 1975. Annual releases since 1975 have been published in a series of publicly available annual reports entitled <u>Environmental Monitoring in the Vicinity of the Savannah River Plant</u> .

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>THERMAL DISCHARGE</u>		
AP-3	The DEIS's plan to discharge 176,000 gallons per minute of scalding water into Steel Creek, is totally unacceptable, and is a direct violation of state water quality standards. It appears that the DOE continues to assume it can exempt itself from the water quality regulations that it expects private industry to meet. DOE facilities must be required to comply with federal and state environmental standards, and therefore the Final EIS must provide a comprehensive study of viable, legal alternatives to the plan proposed in the DEIS.	See the responses to comments AA-1 and AA-3 regarding issuance of an NPDES permit for thermal discharge and DOE's commitment to comply with applicable federal and state regulations, and the response to comment AB-13 regarding information on cooling-water alternatives contained in the EIS.
<u>ECOLOGY</u>		
AP-4	The DEIS's plan to destroy 1000 acres of valuable wetlands and turn Steel Creek stream into a non life-producing mudflat is also an unacceptable solution. The DEIS fails to address how the DOE plans to mitigate the fatal effects which the extremely high thermal temperatures will have on the majority of existing forms of aquatic and other endangered species. The DEIS states that forms of aquatic life such as snakes, turtles, fish larvae, will be destroyed and the endangered American alligator's habitat will be eliminated.	The mitigation of thermal impacts to aquatic and endangered species could be attained through the implementation of alternative cooling systems, which are described in Section 4.4.2 and Appendix I of the EIS. Also see the response to comment AA-1 regarding cooling-water alternatives. The National Marine Fisheries Service has concurred in DOE's determination that the restart of L-Reactor operation will not jeopardize the population of the shortnose sturgeon in the Savannah River. On February 25, 1983, the FWS issued a Biological Opinion on the American alligator (<u>Alligator mississippiensis</u>), which stated that the operation of L-Reactor as proposed (direct discharge, of cooling water) would not jeopardize the continued existence of this species. Since the issuance of this opinion, the Department of Energy has identified the discharge of cooling water to a 1000-acre cooling lake as its preferred cooling-water system for L-Reactor. An updated biological assessment that includes the Department's preferred cooling-water system was transmitted to the FWS at the end of March 1984. Currently, the Department is awaiting the review of this updated assessment by the FWS. The Department anticipates that the FWS review will not alter the prior opinion that the operation of L-Reactor would not jeopardize the continued existence of this species. Also, see the response to comment AD-3 regarding the wood stork.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AP-5	In addition, the DEIS comments that the increase in water temperature could precipitate the onset of red sore, a bacterium-caused disease that would have serious detrimental effects on the already endangered American alligator. And the DEIS's plan for a winter startup would be fatal to adult alligators that overwinter in shallow water areas. The DEIS doesn't explain what mitigation measures it plans to instigate to protect this species.	Red sore disease is caused by the bacterium <u>Aeromonas hydrophilla</u> , a ubiquitous organism in surface waters in the southeast. Any increased incidence of red sore disease is more likely to be a result of stress on the host organism rather than changes in the bacterium. Alligators are expected to avoid the heated effluent by moving to peripheral unaffected wetland areas.
AP-6	The Final EIS must make this information available and provide information regarding the Biological Opinions obtained from the U.S. Fish and Wildlife Service.	Section 7.3 of this final EIS presents the current status of DOE's consultations with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.
	<u>GROUNDWATER CONTAMINATION</u>	
AP-7	The DEIS fails to address or explain the causes for the serious contamination of the Tuscaloosa aquifer, and how the wastes will be handled in the future to prevent further contamination. Since the L-Reactor startup will increase by 33 percent the load on seepage basins which are currently leaking toxic chemicals into the aquifer, the question of how this problem will be corrected is a very crucial one. The DEIS tells us that the mitigation of this contamination will be the subject of a separate NEPA review. Our organization feels that this issue not be dismissed until a later date, but must be addressed in the Final EIS.	See the response to comment AJ-1 regarding seepage basins and ground-water contamination at SRP.
	<u>THE NEED FOR THE L-REACTOR</u>	
AP-8	The DEIS miserably fails to comply with the requirements of the National Environmental Policy Act in this area. The DEIS fails to adequately address alternatives to the L-Reactor restart and fails to explain why the restart is crucial at this time.	See the response to comment AB-2 regarding the discussion of need and production alternatives in the EIS.
	<u>CONCLUSION</u>	
	Please send copies of our comments to the preparers of the DEIS, whose names are listed on pages LP-2 through LP-14 in Volume 2.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AP-9	On behalf of Radiation Awareness, I request that a discussion meeting be arranged as soon as possible between consultants with NUS Corporation, State/Federal officials and representatives of commenting organizations, including Radiation Awareness. The purpose of this meeting would be to discuss the failures of the DEIS, which if repeated in the Final EIS would prevent the document from complying with the National Environmental Policy Act. Sincerely, Janet T. Orsell Research Consultant Radiation Awareness Box 81 Folly Beach, SC 29439 Tel. 803-588-2322	DOE conducted a 45-day public comment period and held four public hearings to receive comments on the Draft EIS. Representatives of DOE were available at the public hearings to discuss any questions following the hearing session.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

STATEMENT OF MARY G. DABBS

October 25, 1983

Dear Mr. Sires,

I oppose strongly the resumption of the L-Reactor operation at the Savannah River Plant in Aiken.

Comment noted.

Please include my position in your response to the decision.

Thank you,

Mary G. Dabbs
854 Barton Woods Rd, N.E.
Atlanta, GA 30307

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF SHERRY W. CLEMENTS		
	Dear Mr. Aiken,	
	I oppose strongly the resumption of the L-Reactor operation at the Savannah River Plant in Aiken!	Comment noted.
	Please include my position in your response to the decision.	
	Yours truly,	
Oct. 25, 1983	Sherry W. Clements	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
LETTER OF AGNES H. EVERETT AND CHARLES H. EVERETT		
Mrs. Charles Henry Everett 4211 Devine Street Columbia, South Carolina 29205 October 25, 1983 Mr. Melvin J. Sires, III DOE U.S. Dear Mr. Sires,		
AS-1	My husband and I strongly urge--we'd like to demand--that DOE facilities be required to comply with Federal and state environmental standards applicable to commercial reactor sites, and	See the responses to comments AA-3 and AF-1 regarding DOE's commitment to comply with applicable Federal and state environmental regulations and the differences between SRP reactors and commercial light-water reactors.
AS-2	That steps be taken to avoid damage to the environment before start up.	See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state environmental regulations and to take all reasonable steps to mitigate impacts.
AS-3	We do not want to see more pollution and creation of wastelands in our wetlands.	Comments noted.
Sincerely, Agnes H. Everett Charles H. Everett		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF ROBERT J. MARSHALL		
LUTHERAN THEOLOGICAL SOUTHERN SEMINARY 4201 North Main Street Columbia, South Carolina 29203		
October 27, 1983		
Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801		
Attn: EIS for L-Reactor		
I continue to be concerned about the way the planned start-up of the L-Reactor at the Savannah River Plant is being managed.		
AT-1	The most recent information indicates that hundreds of thousands of gallons of scalding water will be discharged into Steel Creek in violation of state regulations.	See the responses to comments AA-1 and AA-3 regarding cooling-water alternatives and DOE's commitment to comply with applicable Federal and state regulations, and the response to comment AB-13 regarding information on cooling-water alternatives contained in the EIS.
AT-2	A 33% increase in load will occur for seepage basins that are already leaking toxic chemicals into the Tuscaloosa aquifer. These and other facts represent significant impacts which need to be avoided.	See the response to comment AJ-1 regarding seepage basins and ground-water contamination at SRP.
AT-3	I am convinced that the Department of Energy has not considered adequately all of the options to its present plans. The Department must take public, written and detailed notice of the assessment now being made of the Environmental Impact Statement by many experts.	DOE began preparing the L-Reactor EIS based on comments received on an Environmental Assessment (DOE/EA-0195), comments from the public hearing conducted by the Senate Armed Services Committee on February 9, 1983 (Senate Hearing 98-18), and from the 90-day public review period on the hearing record of the Senate Armed Services Committee hearing (DOE/SR-OE-5007). The final scope of the EIS is based on the substantive comments

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		received during the scoping period, including those received at four scoping hearings (Scoping Report for the Environmental Impact Statement, DOE/SR-OE-5008). In developing the EIS, DOE used standard methodologies and relied on scientific and other sources of information compiled from more than 100 publicly available documents that had been developed during the last 30 years, including data from ongoing studies. This final EIS includes discussions of concerns identified by Federal, state, and local agencies, private organizations, and individuals during the EIS public review process. This EIS is available to all interested agencies and the public. After the final EIS is available, DOE will issue a public Record of Decision based on the EIS.
	Please give careful consideration to the welfare of the people in the Southeast. Sincerely, Robert J. Marshall	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	THE TOWN OF JACKSON Telephone 471-2227 Jackson, South Carolina 29831	
	October 10, 1983	
	United States Department of Energy Savannah River Operations Office P.O. Box A Aiken, South Carolina 29801	
	Gentlemen:	
	The Town of Jackson, South Carolina, is a close neighbor to the Savannah River Plant located in Aiken County, South Carolina. We have enjoyed very good relations with SRP officials for over thirty (30) years.	Comments and resolution noted.
	We have extreme confidence in the DUPONT Company, the Department of Energy and the United States Government, that all phases of Plant operations will be done safely and economically. Based upon these determinations we would like to propose the following resolution.	
	<u>RESOLUTION</u>	
	THE TOWN COUNCIL AND MAYOR DO HEREBY RESOLVE TO GIVE THEIR FULL SUPPORT TO THE STARTUP OF THE L-REACTOR.	
	BE IT FURTHER RESOLVED THAT THE TOWN OF JACKSON DOES FULLY SUPPORT THE BUILDING OF A NEW REACTOR AT THE SAVANNAH RIVER PLANT.	
	WE URGE THE UNITED STATES DEPARTMENT OF ENERGY TO GIVE THEIR FULLEST CONSIDERATION TO SRP BEFORE SELECTING A SITE FOR THIS NEW REACTOR.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
Respectfully submitted:		
	<u>COUNCIL MEMBERS</u>	
	Hoyt E. Dunsfeth, Mayor	Fred Darnell A. Ellis
	CC: President, Ronald Reagan	
	US Dept. of Energy Secretary	
	Senator Strom Thurmond	Dennis Boring Jean Collier
	Senator Fritz Hollings	
	Rep. Butler Derrick	
	Governor Richard Riley	
	State Rep. Irene Rudnick	Gurney Wiggins Russell McKinney
	Chmn Aiken County Council	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF DORETHEA SMITH		
October 31, 1983		
Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801 Attn: EIS for L-Reactor Dear Mr. Sires: I'm very concerned about the Environment we live in today, we have the Department of Energy (DOE) along with the Environmental Impact Statement. The L-Reactor Operation at the Savannah River Plant should be studied very careful because we are talking about human beings, and the Environment which we live in.		
AV-1	The startup of the L-Reactor will increase by 33% the load on seepage basins currently leaking toxic chemical into freshwater source for much of the Southeast.	See the response to comment AJ-1 regarding seepage basins and groundwater contamination at SRP.
AV-2	The amount of liquid high-level wastes produced at the Savannah River plant will increase by 33%.	Incremental processing by the chemical separations facilities as a result of L-Reactor operation will generate 1150 to 2300 cubic meters of liquid waste per year. This volume will be concentrated to 380 to 760 cubic meters per year. A maximum of three tanks would be required per decade of L-Reactor operation; however, because the Defense Waste Processing Facility is expected to be immobilizing SRP high-level waste into borosilicate glass by 1989, no new high-level radioactive waste tanks are expected to be required for L-Reactor. Section 5.1.2.8 describes the incremental impacts of L-Reactor on the waste-management operations at SRP.
AV-3	The Department of Energy plans involve the flushing of radioactive cesium into the Savannah River. This is not safe and I feel the startup of the L-Reactor should be avoided in South Carolina.	See the response to comment AA-2 regarding the relationship of radiocesium and radiocobalt concentrations to EPA drinking-water standards.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AV-4	The Department of Energy facilities should be required to comply with Federal and state environmental standards applicable to commercial reactor sites;	See the responses to comments AA-3 and AF-1 regarding DOE's commitment to comply with applicable Federal and state environmental regulations and the differences between SRP reactors and commercial light-water reactors.
AV-5	and very serious steps be taken to avoid damage to the Environment before startup. And if proving found not to be safe for our Environment that we live in, I urge you and others not to start up the L-Reactor in South Carolina for the production of plutonium. I would like to have a copy of the Final Draft Environmental Impact Statement, along with any other information you may be able to share with me. Thanking you in advance for your assistance.	See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state environmental regulations and to take all reasonable steps to mitigate impacts.
	Sincerely,	
	Dorethea Smith	
	ADDITIONAL COMMENTS MADE AT PUBLIC HEARING ON NOVEMBER 1, 1983	
AV-6	As we can see, when we have public hearings to invite citizens here to meet with you to discuss the issue at hand, it's a time when citizens are at work. Most citizens are at work at 9:00 o'clock, and some of them are at work at 6:00 o'clock.	Hearings were held at both 9 a.m. and 6 p.m. in Augusta, Georgia, Aiken and Beaufort, South Carolina, and Savannah, Georgia, to provide a maximum opportunity for citizen response with minimum interference to work schedules. In addition, written comments were solicited in the EIS and in newspaper advertisements from persons who were unable to attend the hearings or who wished to supplement their oral statements.
AV-7	I'm sure we can't make it available for all that are concerned, but we should do something in the interest of the people that are being -- their lives are being jeopardized by trying to restart the L-Reactor.	As stated in the EIS, DOE will comply with all applicable Federal and state environmental protection regulations.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AV-8	I'm sure you have people who are saying that the L-Reactor is safe, but we understand that there's very toxic chemical that are being produced at the Savannah River Plant that causes birth defects and causes a lot of effects to human beings. We are asking each of you to please do something about the environment that we live in. We have the EPA; we have DOE; we have all these people who are working that's supposed to be protecting the environment which we live in. And every time you look around, there's something wrong. As you can see, we have people being born with a lot of birth defects, and it's no more than the toxic chemicals that we are drinking from our table.	Toxic chemicals and radioactive materials being produced and/or utilized at the Savannah River Plant are contained and handled in a safe manner. Releases to the environment are maintained within strict limits. The calculated overall reference case health effects to the population within an 80-kilometer radius around SRP and in the downstream population that consumes river water are 0.002 and 0.005 excess cancer death from the first and tenth years of L-Reactor operations, respectively. Risks from a 10-percent core-melt reactor accident are even lower, about 2.4×10^{-6} excess cancer death per reactor-year (Section 4.2.1.5). No detrimental health effects due to releases from the Savannah River Plant have been observed, and none are predicted to occur as a result of L-Reactor operation beyond those already identified in the EIS (Sections 5.1.2.5 and 5.2.7). These conclusions are supported by three health effects studies by Professor H. I. Sauer of the University of Missouri-Columbia (now retired), whose findings show no evidence of unusual cancer or infant death rates near the Savannah River Plant (Section 6.1.5).

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

STATEMENT OF A. R. JARRETT, PH.D., P.E.

THE PENNSYLVANIA STATE UNIVERSITY
249 AGRICULTURAL ENGINEERING BUILDING
UNIVERSITY PARK, PENNSYLVANIA 16802

College of Agriculture
and
College of Engineering
Department of Agricultural Engineering

October 28, 1983

Mr. Melvin J. Sires
Savannah River Operations Office
P.O. Box A
Aiken, SC 29801

Dear Mr. Sires:

In a letter dated October 27, 1983, I contributed a few comments to the Draft EIS on the L-Reactor Operation at Savannah River Plant. There was one correction necessary in that statement. I would appreciate if you would disregard the earlier comment and replace it with the enclosed statement. Thank you for your consideration.

Sincerely,

A. R. Jarrett, Ph.D., P.E.
Associate Professor

ARJ/sek

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AW-1	I have reviewed both Volume 1 and 2 of the draft Environmental Impact Statement (EIS) on the L-Reactor Operation at the Savannah River Plant (SRP). My review was limited to the areas of surface and subsurface hydrology and soils, areas of my expertise. Based on this review, I find this EIS to be in quite good condition, having addressed the necessary issues. I have noted below one or two areas of concern. These areas of concern appear to be based on interpretations of data collected and published in the EIS. Page 3-25 and Appendix F reveal an extensive review of the total heads existing at various locations within the SRP. These results are summarized several places, partially Fig. 3-8 and 3-9, which show most of the SRP to be in a zone of upward hydraulic gradient from the Tuscaloosa formation to the Congaree formation. The equal potential map, Fig. 3-9, reveals the magnitude of these head differences ranging from an upward head difference of greater than 30 ft. in the swamp region near the Savannah River where the Congaree is drawn down to support the flow in this river. As one moves northward, the upward differential decreases until it reaches an equal head condition near Par Pond and then a reversal implying that there is presently flow from the Congaree into the Tuscaloosa in the area of Par Pond. Figure 3-9 does not quantify the magnitude of this downward gradient but does suggest that Par Pond and the surrounding area is a recharge zone for the Tuscaloosa. This entire analysis is done using well data from the area, but nothing is said about the condition of pumping or the pumping history of wells used in the analysis when the head data were taken. It must be assumed that these data are under conditions of no withdrawal. The only pump drawdown data I could find in the report was on page 3-36 where drawdown values of 6 to 12 meters are suggested as typical for the existing withdrawal rates of the Tuscaloosa. If one superimposes these drawdowns to the stagnant well levels from the Tuscaloosa, the area of downward gradient enlarges as shown in Figures 1 and 2 (Your Figure 3-9 adapted). Even using the 6-m data enlarges the recharge area to include the L-Reactor area and during discharges creating a 12-m drawdown essentially the whole SRP becomes a recharge area.	The head differences between the upper Tuscaloosa and Congaree Formations at SRP (discussed in Sections 3.4.2.4 and F.4.1) were developed from measurements of the water levels that were made in monitoring wells in these formations, not in production wells. Thus, the head relationships shown in the EIS represent conditions during withdrawals of ground water by production wells. Figures 3-9 and F-30 have been modified to more accurately reflect the subtraction of the piezometric surfaces shown in Figures F-9 and F-18. In M-Area, which produces fuel and target assemblies for SRP reactors, the downward gradient between the Congaree and Tuscaloosa Formations was about 5.5 meters in 1982 (Section F.2.3). This is expected to increase to about 8.5 meters because of pumpage increases in support of L-Reactor operation. Sections 4.1.1.3 and 5.1.1.4 describe the long-term drawdowns in the Tuscaloosa beneath seepage and ash basins in L-, K-, F-, H-, and M-Areas. For example, beneath the L-Area seepage basin, the upward head differential would decrease to 1.4 meters in the long-term. Calculations indicate that the decline (about 0.16 meters per year) in water levels in wells used to monitor heads in the Tuscaloosa aquifer are primarily related to increased pumping rates at SRP (Section 3.4.2.5). Because pumping rates are expected to be relatively stable over the next six years with pumping rates less than in 1983 (Sections 5.1.1.4 and 5.2.3) this rate of decline (0.16 meters per year) is not expected to continue. Changes in the equilibrium piezometric surface developed in response to changes in SRP pumping rates occur very rapidly with near equilibrium levels being attained in about 100 days (Section F.4.2). Thus, stabilization of pumping at SRP is expected to stabilize Tuscaloosa water levels at SRP. A key point of the discussions in

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	This concern is further confounded by extrapolating the well water levels shown in Fig. 3-11 into the future. The water level (I assume stagnant) in well P7A has been declining at the average rate of 0.16 m/yr. and at this rate will reach the head levels in the Congaree (55.0 m) in 2012. A similar extrapolation for wells P5A, P54, and P3A shows the gradient reversal will occur in about 1990 for well P5A and that it already has occurred for the other two wells. I feel the key point which needs to be brought out in the EIS is that a closer look at these data reveals a problem which already exists is the area of the Par Pond and will more than likely increase in magnitude with time assuming the water withdrawal rates at SRP continue to remain about constant. The startup of the L-Reactor will have only a very small impact on this rate of change since the increased water for the L-Reactor is small.	Sections 3.4.2 and F.2 is how the characteristics of the hydro-stratigraphic units in the central portion of the SRP afford protection against the contamination of the Tuscaloosa aquifers. The clay layer at the base of the Congaree formation and the upper clay layer of the Eilenton formation are effective confining units and tend to protect lower ground-water sands throughout the SRP (see the response to comment AJ-1, Table F-1, and Section 5.1.1.4, which have been revised). Pollutants entering shallow groundwater will migrate to onsite streams. This is not the case in M-Area, as noted in Section 5.1.1.4, and in the response to AJ-1.
AW-2	The remaining data, which makes this evaluation somewhat unimportant is that the EIS does not outline the extent and locations of the waste disposal operations at the SRP. The assumption has been made, and maybe rightfully so, that the restart of the L-Reactor will have no impact on any of the waste disposal operations within SRP. The EIS does, however, mention (p. S-5) the air-stripping clean up of the Congaree formation which is underway in Area M which implies the same waste disposal situation may evolve in Area L. If sedimentation, evaporation or adsorption waste disposal basins are needed as a result of the L-Reactor restart, their location north of the 6-m drawdown line (Figure 1) can be expected to eventually contaminate the Tuscaloosa especially if non-adsorbed species are included in the waste such as tritium.	The amounts of waste generated and the facilities to be used due to the restart of L-Reactor and incremental support facility operation are discussed in Sections 4.1.1.7, 4.1.2.8, and 5.1.2.8 of the EIS. The quantities of nonradioactive and radioactive pollutants that would be released to seepage basins due to the operation of L-Reactor and its support facilities and the locations of these basins are discussed in Section 3.4.2.2 (location of L-Reactor seepage basin), Sections 4.1.2.2 and 4.4.3.2 (discharges to L-Reactor seepage basin), Section 5.1.1.2 (incremental nonradioactive releases to K-, F-, H-, and M-Area basins), Section 5.1.2 (incremental radioactive releases to basins in the Central Shop area and F-, H-, and M-Area seepage basins), and Appendix F (location of L-, H-, and M-Area seepage basins). Changes to this EIS have been made to reflect the wastewater discharge rates to seepage basins and to more completely describe impacts to ground-water quality and surface water quality impacted by ground-water releases. Based on observations in monitoring wells (Appendix F and Du Pont, 1983 (DPST-83-829)), it is very unlikely that the Tuscaloosa Aquifer will become contaminated due to the operation of L-Reactor and its support facilities in the central portion of SRP. In the central portion of the SRP the green clay (which

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AW-3	A second area of concern is about the expanding delta expected to evolve near the outflow of Steel Creek into the Swamp. Nowhere is the cause of this delta growth described. Are the increased flow rates (minor) expected to accelerate the stream bank erosion to produce the delta? Are particulates from the Reactor included in the discharge stream? Or are natural erosion rates in this area sufficient to produce this delta?	(is discontinuous in A- and M-Areas) and the clays which overlie the Tuscaloosa are effective confining units. The green clay supports large head differences and has been an effective barrier to the downward migration of contaminants to the Congaree Formation. In L-Area this clay is 7 meters thick. Contaminants that might reach the Congaree in L-Area would be transported beneath SRP to the Savannah River in about 76 years. In A- and M-Areas, the chlorinated hydrocarbons reported in the Tuscaloosa Aquifer have entered A-Area production wells via defects in the cement grout of at least one production well and Tertiary groundwaters. Also see the response to comment AJ-1 which discusses the entry of chlorinated hydrocarbons into the Tuscaloosa aquifer, remedial action measures, and the F-, H-, and L-Area seepage basins. Section 4.1.1.4 of the EIS has been expanded to indicate that delta growth will be caused by erosion of the Steel Creek streambed and banks. The flushing of sediments, accumulated in the 186-basin from the withdrawal of water from the Savannah River, to Steel Creek would contribute only small quantities of sediments to the delta area.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment
number

Comments

Responses

M-81

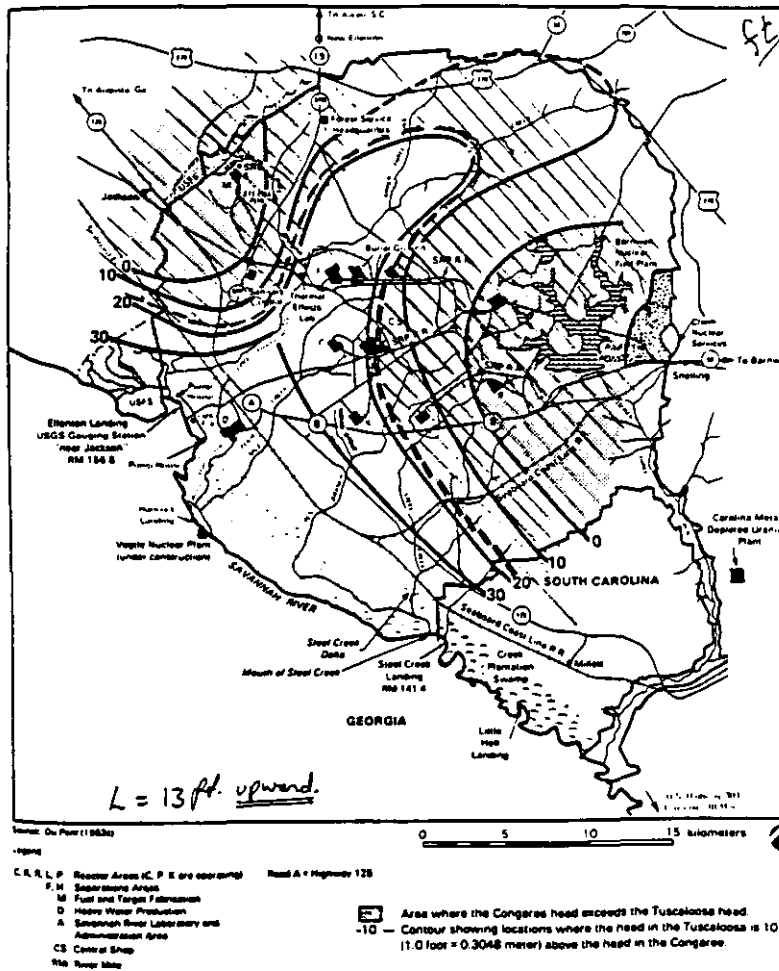


Figure 3-9. Head difference between upper Tuscaloosa and Congaree Formations at SRP.

Figure 1. Equal Head Location Assuming 6-m Drawdown.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

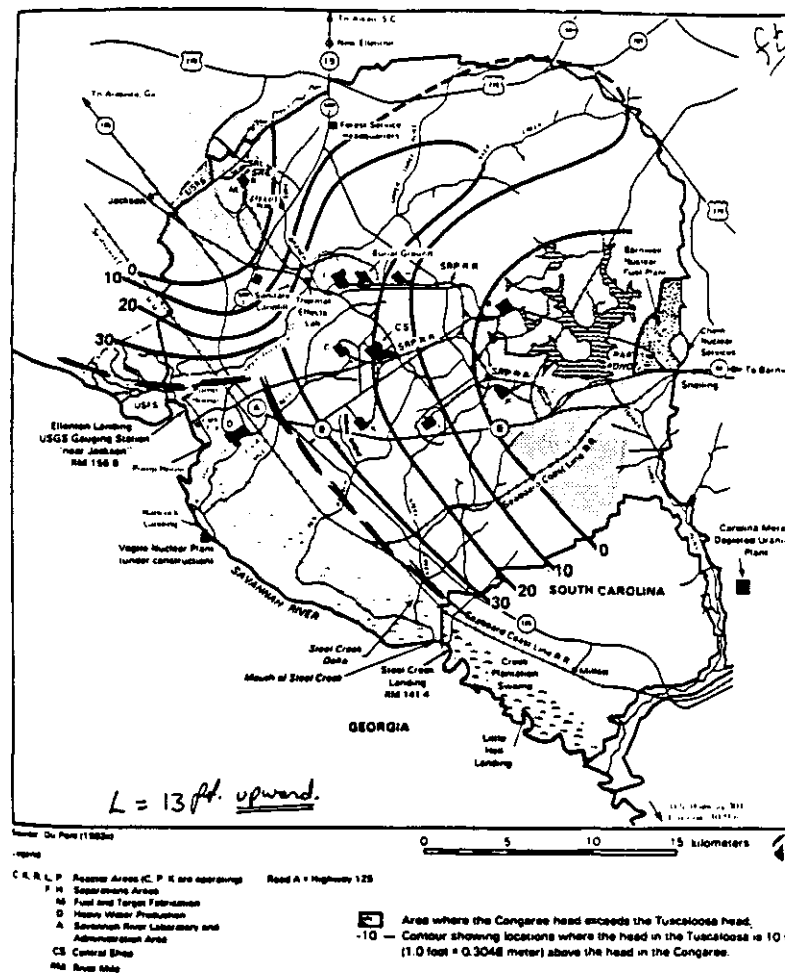


Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF IRA DAVIS		
M-83	Mr. Chairman, the Richmond County Property Owners Association wishes at this time to go on record as being heartily in favor of and endorsing the immediate restart of L-Reactor at the S.R.P. without waiting for any more "impact" studies, environmental studies or any other studies.	Comments noted.
	I suggest to you and to this audience that we have already "studied" the subject to death. The most important "study" and the study having the most bearing on the subject is the long successful operation of the entire plant. For thirty years plus it has lived in our midst. There have been no accidents, no babies have been born with three heads and the statistically normal number of people have departed from this world with the usual diseases. How much more proof do we need?	
	L-Reactor is a vital part in upgrading the nation's defense posture. Daily the news swirls around our heads of Red adventurism in every quarter of the globe - Cuba, Grenada, Lebanon - and probably some we don't even know about yet!	
	The only thing that keeps us free from Red attack is the sure and certain knowledge of the men in the Kremlin that an attack would bring a blow down on their own heads in return. No one starts a war they can't win.	
	So let us have done with worrying about what may happen to some obscure species of fish and fowl if we start up L-Reactor. Let us start worrying about what may happen to us if we do not start it up.	
	Let's do it now. It means a better defense, more jobs in our local economy, more money spent in our local business places and increases our chances of sleeping peacefully in our beds at night and dying at a ripe old age in a world at peace.	
	So in conclusion I say to my environmentalist friends. I respect your convictions gentlemen but I am a great deal more worried about what may happen to mankind while we debate the subject than I am worried about some species of fish if we take this step to make ourselves stronger.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

Thirty years of quite remarkable efficiency should, I think, speak for themselves and deserve to be heard. Let them be heard, here and now.

Ira Davis
Pres. R.C.P.O.A.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF JUDITH E. GORDON		
October 31, 1983		
SIERRA CLUB South Carolina Chapter ...To explore, enjoy and preserve the nation's forests, waters, wildlife and wilderness...		
To: Dept. of Energy, Savannah River Plant Operations From: Dr. Judith E. Gordon Re: Draft EIS, L-Reactor Operation, SRP		
I am here representing the South Carolina and Georgia Chapters of the Sierra Club.		
This is the fourth time that we, from our opposing points of view, have met to address the environmental problems associated with L-Reactor restart. Speaking for myself, I am thoroughly disheartened with the entire business, particularly when DOE seems determined to proceed with its original plans in spite of all the evidence that contradicts the wisdom of restarting this reactor. It is especially disheartening that few people will know or even care what happens given that press coverage deals more with the general statements made by both sides but seldom covers the evidence that supports these statements. None-the-less, if it is possible to convince even a few persons, then the effort is well made.		
AY-1	Having read the Environmental Assessment, and knowing of its inadequacy, I find it difficult to understand why DOE contracted the EIS to the same corporation that produced the EA found wanting by not only environmental groups, but by the United States judicial system as well. Thirty-seven of the 41 preparers of this questionable document are affiliated with NUS Corporation. I believe an explanation is in order.	See the response to comment AB-20 regarding the opinion of the United States District Court and the preparation of the <u>Finding of No Significant Impact</u>.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	It is indeed difficult to understand how any final conclusion can be drawn from this document when several critical studies have yet to be incorporated, e.g.	
AY-2	1. Studies on the wood stork, an endangered species, are still being completed. Yet even the partial evidence, to quote the EIS, "...indicate that the Savannah River Swamp, particularly the deltas of Beaver Dam and Steel Creek, represents important feeding habitat for wood storks of the Birdsville rookery." Quoting further, "A total of 386 wood storks have been observed on the SRP site in summer 1983. Foraging sites on Savannah River Plant were used by more wood storks than other regional wetlands based on the number of birds per foraging location." (C-37) Need I remind you that once a species is gone, it is extinct forever, and forever is a very long time.	Appendix C, Section C.3.2 of this EIS contains more detailed information on the woodstork than was available for the preparation of the Draft EIS. Section 7.3 of this final EIS presents the current status of DOE's consultations with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.
AY-3	2. Information on another endangered species, the shortnose sturgeon, is also incomplete. Although larvae have not yet been found in Steel Creek, they have been found in nearby areas.	The shortnose sturgeon is discussed in Appendix C, Section C.4.2.2 of this EIS. Additional data on the shortnose sturgeon from recent fisheries studies has also been included in Appendix C. In 1982, two shortnose sturgeon larvae were collected at River Mile 157.3, which is upstream from the IG canal. In 1983, seven shortnose sturgeon larvae were collected, five in the Savannah River adjacent to SRP (two from the canal and three from the river). Two larvae were also collected at River Miles 79.9 and 97.5, both of which are more than 60 miles downriver from SRP. DOE has prepared a Biological Assessment on the shortnose sturgeon which was provided to the National Marine Fisheries Service (NMFS) on October 28, 1983. On November 1, 1983, NMFS concurred in the DOE determination that SRP operations would not jeopardize the population of the shortnose sturgeon population in the Savannah River. The EIS has been revised to reflect this NMFS concurrence.
AY-4	3. At the scoping hearings I requested that information on wetlands importance be incorporated into the EIS, particularly with input from state agencies. On p. 5-24 a cursory treatment is given with no information on the extent of wetlands loss in Georgia and South Carolina. DOE would have us believe that this is a rather insignificant problem. After all, why get upset about swamps filled with mud, mosquitos, and moccasins? Of course, well-informed people know that	To date, there has been no published comprehensive inventory of wetlands in the contiguous United States. The U.S. Fish and Wildlife Service is in the process of inventorying the Nation's wetlands but current data in South Carolina and Georgia are restricted to coastal ecosystems. Neither South Carolina nor Georgia have an inventory of their wetland resources. Although no comprehensive inventory presently exists for wetlands, from available data, there were about 58 million acres

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	wetlands loss is one of our more important environmental problems in the United States today.	of bottomland hardwood forests in the United States (Clark and Benforado, 1981). Approximately 11.4 percent and 10.1 percent of the total land area of the States of South Carolina and Georgia, respectively, contain bottomland hardwood forests. The Savannah River watershed contains about 258,000 acres of wetlands dominated by bottomland hardwood forests. Of this total, South Carolina contains 138,000 acres and Georgia has 120,000 acres. From 1960 to 1975, South Carolina lost about 30,000 acres and Georgia lost 141,000 acres of bottomland hardwood forests. The overall net loss of bottomland hardwood forest wetlands from 1950 to 1970 was 6 million acres (Frayer et al., 1983). Section 4.4.2 and Appendix I assess cooling-water mitigation alternatives and their effects on wetlands. The purpose of presenting this information is to enable the decisionmaker to formulate a reasoned decision on the implementation of a cooling-water mitigation alternative--including the importance of the wetlands to be affected--in relation to the need for required defense nuclear materials. Also see the response to comment AA-1 regarding revisions to Section 4.4.2 and Appendix I contained in this final EIS.
AY-5	DOE assumes that if the Steel Creek corridor recovered from mistreatment once, it can do so again. This is probably true to a degree, but the next recovery might be made without the wood stork, without the shortnose sturgeon, and at the expense of further depletions in Savannah River fish populations. In the 1950's few people knew anything about thermal pollution. Have we learned nothing in the interim? It would seem so.	See the responses to comment AA-1 regarding cooling-water mitigation alternatives, and the responses to comments AY-2, AY-3, and AY-6 regarding the woodstork, shortnose sturgeon, and fish populations.
AY-6	I wonder how many fishermen in the CSRA are aware of the following: 1. With restart of the L-Reactor, the number of fish eggs and larvae lost to entrainment in water intake canals at SRP will be about 19% of the numbers passing through the river along SRP?	The estimated cumulative percentage of fish eggs and larvae passing the Savannah River Plant in the river that will be lost to entrainment by the combined operation of C-, K-, and L-Reactors is about 19 percent (see Section 5.2.5.2 of the EIS). During periods of high water, the cumulative total fish impinged could reach about 104 fish per day, 31 of which would be due to L-Reactor operation (see Section 5.2.5.3 of the

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	2. With restart of the L-Reactor, total fish losses due to impingement will be about 19 per day but possibly as high as 104/day during high water?	EIS). Of the 1315 fish impinged during these high flow periods, bluespotted sunfish, threadfin shad, and gizzard shad made up the majority of those impinged (60 to 90 percent). The total individuals collected during these peak periods were small, averaging only about 9 grams in weight with an average total length of about 80 millimeters (approximately 3 inches).
AY-7	3. That comprehensive studies of river biology have been underway for only the last few years and that "The flood plain swamp, which includes the Steel Creek delta, bordering the river is the least known aquatic habitat on the Savannah River Plant."? (C-39)	The overall SRP swamp remains a relatively unstudied ecosystem, in sharp contrast to the Steel Creek delta region. The Steel Creek area will be affected by the L-Reactor restart. Intensive studies of the Steel Creek region of the swamp were initiated in 1980 as a component of the L-Reactor environmental studies. The results of these studies are included in Chapters 3, 4, and 5, and in Appendixes C, D, and I of the EIS. Information on the remainder of the swamp is less complete, but extensive ecological studies have been initiated as part of the comprehensive cooling-water study. Additional information from recent fisheries studies has been included in Chapter 4 and Appendix C of this Final EIS.
	There are other areas of concern dealing with wetlands and thermal pollution that contain questionable information, but I will submit written comments later.	
AY-8	I would now like to comment on another area of concern, that of emergency preparedness, particularly at the county level, and particularly given the age of reactors at SRP, including L-Reactor. I was somewhat surprised to learn that counties surrounding SRP are just now beginning to work with DOE to coordinate emergency procedures in the event of a major accident at SRP, one that would release radioactive contamination beyond SRP boundaries. The lateness of this concern is difficult to understand since local officials would likely be the first to deal with such emergencies. Even more surprising, Richmond County, GA, according to the EIS, has not developed any plan. The attitude seems to be that the projected accidents will never be severe enough to endanger the Augusta area and that the probabilities are so low that there is nothing to worry about. Officials at TMI probably said that, too.	Appendix H describes SRP emergency planning. Additional information on the current status of emergency planning and emergency planning zones has been provided in Appendix H of this Final EIS. With respect to Richmond County, the closest boundary lies farther than 10 miles from any SRP reactor and the Augusta city limits are more than 20 miles away. Calculated consequences of the worst credible accident at SRP are lower than EPA protective action guides for emergency planning at this distance, even under extreme meteorological conditions.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AY-9	In fact, the EIS does not clearly establish how the probabilities are calculated. Also, the accidents suggested could be more severe than projected in the EIS.	Section 4.2.1.4 of the EIS has been modified to include the basis for the probabilities. The accidents analyzed in Section 4.2.1.4 incorporate conservative assumptions: for example, the moderator spill accident considers tritium concentrations that are 30 to 40 percent higher than actual concentrations for current and planned charges; credit is not taken for any spray-system removal of airborne particulates or iodine in the discharge mishap; core-melt accidents consider a power level of 3000 megawatts, which is more than the actual power level at which L-Reactor will operate. Additional failures or more extreme meteorological conditions would be required for the accidents to be more severe than projected in the EIS. Additional failures would result in accident sequences of lesser probability than those considered in the EIS, and, as such, are not considered credible. The EIS provides an analysis of a hypothetical 10-percent core-melt accident that is more severe than any considered credible. The results calculated for credible accidents and the beyond-credible 10-percent core-melt accident assume meteorological dispersion conditions that are taken to be neither the best nor the worst for the site, but rather an average value determined by actual site measurements; they represent realistic values. Calculations to estimate the potential upper bounds for individual exposures from the same initiating accidents in the EIS were calculated in a Safety Analysis Report assuming extreme meteorological conditions rather than average conditions.
AY-10	Perhaps of more crucial concern is the failure of the EIS to deal adequately with another potential problem likely to be encountered by local officials--that of transport accidents. L-Reactor restart will add to the radioactive load already present at SRP. It will add to the processing to be done at the Waste Disposal Facility, and the subsequent shipping of high-level waste to a permanent repository, yet-to-be-designated. Several environmental groups, state officials, and local officials in other areas have questioned the adequacy and safety of the shipping casks and transport routes.	Section 4.3 of the EIS describes transportation requirements and transportation risks associated with L-Reactor operation. Transportation requirements and risks associated with the eventual shipment of high-level waste forms from the Defense Waste Processing Facility (DWPF) to a Federal repository are described in the DWPF EIS (DOE/EIS-082). These analyses made use of the NRC EIS on the transportation of radioactive materials (NUREG-0170). The draft EIS (Table 4-30) estimates a transportation risk of 1.1 person-rem per year with a maximum individual exposure of 0.017 millirem per year from offsite transportation activities associated with L-Reactor operation.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		The EIS points out that all offsite shipments of hazardous and nuclear materials in connection with L-Reactor will adhere to Department of Transportation (DOT) regulations 49 CFR 170-179. If shipping casks are required, a DOE- or NRC-approved certificate of compliance with the DOT regulations on packaging is issued. DOE Order 5480.1, Chapter 3, requires that DOE certificates be based on requirements that are equivalent to or better than those of the NRC. The response to a transportation accident varies with the material being transported. For shipments involving appreciable quantities of special nuclear materials, DOE couriers maintain constant radio communications with both DOE and local officials. For other shipments, DOE maintains regional emergency teams to respond to accident situations; Savannah River Plant has the response team for the Southeast. Current DOT regulations require that the shipping papers carried by the driver give instructions on how to contact these response teams. The response system is described in <u>Guidance for Developing State and Local Radiological Emergency Response Plans and Preparations for Transportation Accidents (FEMA REPS), Issued in March 1983.</u> As indicated in Section 4.3 of the EIS, the transportation of high-level radioactive waste is regulated by the Nuclear Regulatory Commission and/or the Department of Transportation. Therefore, all persons or companies involved in any aspect of this transportation must be licensed and all activities must meet regulations and guidelines promulgated by these agencies. In addition, all containers and shipping casks are tested and licensed. Many regulations have been promulgated on the subject and many reports have been issued; existing NEPA-related documents describe the radiological impacts to be expected from normal operations and accidents involving high-level waste. A listing of references for many of these documents are contained in Appendix D of the <u>Final Environmental Impact Statement, Defense Waste Processing Facility, Savannah River Plant, Aiken, South Carolina (DOE/EIS-0082).</u> Also see comment letter "DK" and the responses to that letter.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
AY-11	I see no evidence of concern or attempts by DOE to work with local officials on this problem. The public is generally unaware of the potential hazards. In Appendix H, DOE appears more concerned about media communications than alerting and helping local officials.	The States of South Carolina and Georgia have Nuclear Regulatory Commission and Federal Emergency Management Agency-approved emergency response plans that address, among other things, transportation accidents involving high-level radioactive waste. County plans include the identification of responsibilities, resources, and actions necessary to carry out the jurisdictional requirements of the state plans. These state plans include agreements with DOE-SR and DOE Region 3 Interagency Radiological Assistance Plans to coordinate Federal agency resources for a radiological emergency response in the Southeastern United States. As stated in the EIS, notification agreements have been in place for some time; all parties have agreed to the details of coordinations and responsibilities. The details of protective action planning have been completed for the States of South Carolina and Georgia and all counties except Burke County. The Burke County plan will be completed in June 1984. Drills and exercises to appraise the plans and actions are scheduled for November 1984. At that time, the details of notification and protective actions will be revised and modified as necessary to meet state and county public health and safety response needs.
AY-12	In summary, this EIS is insufficient, biased, and unacceptable. There are solutions to many of the restart problems; cooling towers may be expensive, but wetlands losses are too. It is time to be more concerned about our future health and welfare and less concerned about how many jobs are saved. If we can't adequately protect the people of this country and their environment, perhaps we should ask if we really need this reactor or any others planned for the future.	The subject matter covered in the EIS follows the regulations established by the Council on Environmental Quality for the preparation of an EIS. The EIS assesses environmental impacts so they can be balanced against the need for defense nuclear materials that has been established in the FY84-89 Nuclear Weapons Stockpile Memorandum and approved by the President. Along with other documents on the need for materials, DOE will use this EIS in reaching its Record of Decision. Mitigation alternatives, including cooling towers, are discussed in Section 4.4 and Appendix I. All factors, including environmental impacts, socioeconomic considerations, the need for materials, and health and safety will be considered in the decision process.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF JOHN STANYARNE WILSON		
AZ-1	My name is John S. Wilson, and I would like to express my concern about a general aspect of the draft EIS. It seemed that the EIS did not give serious consideration to alternative procedures that would enable operation of the L-Reactor to comply with state regulations, and decrease the impact on the environment before restart. For instance, the use of fully recirculating mechanical draft cooling towers is a viable alternative cooling water system for the following reasons: 1. It would bring operation of the L-Reactor into compliance with the state delegated NPDES permits, without reclassifying Steel Creek. 2. It would enable the continued growth and regeneration of the wetlands, wildlife, and ecosystem of the Steel Creek corridor, delta, and floodplains. 3. It would decrease the amount of radiocesium entering the Savannah River, a source of drinking water for many South Carolinians and Georgians. 4. It would decrease the amount of water needed to be withdrawn from the Savannah River. 5. It is economically and technologically feasible to implement the system. 6. The reference case of direct discharge into Steel Creek does not allow for any of these benefits, and seems to be the chosen method only because it allows restart of the L-Reactor according to "production schedules."	Section 4.4 of the EIS discusses mitigation alternatives that could reduce potential environmental effects. The discussion of alternative cooling systems, including mechanical-draft cooling towers, has been expanded in Section 4.4.2 of this final EIS. Also see the response to comment AA-1 regarding cooling-water alternatives and the identification of a preferred cooling-water alternative in this Final EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

I feel that the safety and protection of our citizens and our fragile environment takes priority over the necessity of re-start for the production of materials for the nuclear arsenal.

Thank you for listening.

John S. Wilson

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Statement of Karen Arrington on the Draft Environmental Impact Statement L-Reactor Operation Savannah River Plant	
BA-1	My name is Karen Arrington. I live in Easley, South Carolina, 20 miles from Greenville. Since moving here seven months ago, I have become aware that this beautiful state has some very serious environmental problems, the crown jewel of which is the Savannah River Plant. The restart of the L-Reactor will release 33% more emissions and effluents from fuel fabrication and chemical processing and 33% more waste. Instead of mollifying my fears, reading the Draft Environmental Impact Statement has served to greatly sharpen my awareness of the seriousness of radioactive pollution, and has caused me to try to learn something of the nature of what constitutes these silent and invisible rays.	See the response to comment AA-3 regarding DOE's commitment to comply with applicable Federal and state regulations, the response to comment AJ-1 regarding seepage basins and ground-water contamination at SRP, and the response to comment AV-2 regarding high-level radioactive waste.
BA-2	Although the calculations presented in the Draft Environmental Impact Statement are very technical, I seriously question the adequacy of the calculations for concentrations of radionuclides for the first-year and tenth-year operation of L-Reactor. Radioactive substances are concentrated in the lower forms of life and increasingly concentrated as they reach higher forms. A variety of radioactive substances are released from the Savannah River Plant in an environment of many different kinds of living organisms.	The dispersion and concentration of radioactivity released to the environment has been observed and studied for more than 40 years. Pathways and bioaccumulation factors through various ecological chains have been measured for a variety of natural conditions. These data are widely published and subject to intense peer review. The data have formed the basis for radiation exposure models that predict bioconcentrations close to measured values. Actual releases from the Savannah River Plant have been measured for more than 25 years; they have shown a close correlation with predicted environmental concentrations. Thus, concentrations of radioactivity in the environment from expected releases can be predicted with confidence. As more data become available, the models will continue to be refined so predicted values are even more precise.
BA-3	Radiocesium (primarily Cesium-137) is frequently mentioned in the Impact Statement. Radiocesium has already been released in large quantities from the disassembly basins of the L- and P-Reactors to Steel Creek. The Impact Statement traces the radiocesium flow from Steel Creek to the Savannah River downstream more than 10 miles from the confluence of the Steel Creek and Savannah River. Cesium-137 exists in the L-Area	See the response to comment AA-2 regarding the relationship of radiocesium and radiocobalt concentrations to EPA drinking water standards. Because of the relatively high distribution coefficient (K_d) for cesium-137 (up to 3960; see Section D.2.1), the cesium-137 existing in L-Reactor seepage basin soils will not be flushed

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BA-4	seepage basin soil. L-Reactor will again release it into Steel Creek. Cesium-137 is known to be one of the more dangerous radioisotopes in existence. It also attacks the reproductive organs of humans. In addition to the regular annual releases of tritium by currently operating Savannah River Plant reactors, L-Reactor will release 80,000 curies annually of radioactivity, primarily tritium to the atmosphere and 9,600 curies annually directly and indirectly to surface streams. It is well known that in the past, very large releases of tritium have occurred. By these statements from the Impact Statement, it appears that the problem of tritium release is being shoved under the rug. "No facilities are currently available to remove tritium from the reactor moderator." "As noted in the table, 30% of the tritium discharged to the seepage basin is expected to be released to the atmosphere by evaporation." "Due to the low routine releases expected from the L-Reactor and its support facilities, insignificant short- and long-term health risk is anticipated." According to Peter Alexander in his book, Atomic Radiation and Life, "The dose of atomic radiation needed to produce many types of biological effects is often extremely small."	through the unsaturated zone to the water table by the resumed operation of L-Reactor. The doses associated with the L-Reactor releases including tritium are shown in Section 4.1.2 of the EIS to be very low, less than 1 percent of the natural background radiation to the population within 80 kilometers of SRP and the Beaufort-Jasper and Port Wentworth drinking water population. The large releases of tritium referred to have occurred at tritium facilities at the SRP that are not associated with the operation of L-Reactor or its support facilities. These releases and their consequences have been well documented in DP-1639, <u>Environmental Effects of a Tritium Gas Release from the Savannah River Plant on May 2, 1974</u>, DP-1415, <u>Environmental Effects of a Tritium Gas Release from the Savannah River Plant on December 31, 1975</u>, and in the 1975 annual report, <u>Environmental Monitoring in the Vicinity of the Savannah River Plant (DPSPU-76-30-1)</u>. The understanding of the biological effects of ionizing radiation is quite substantial, as discussed in Section B.6 of the EIS. The subject has received intense review by the National Academy of Sciences; it continues to receive intense review. The NAS Committee on the Biological Effects of Ionizing Radiation has recently revised downward its earlier assessment of health effects for a given exposure of radiation. From statistical analyses, there is no correlation of actual cancer death rates with radiation for regions of the United States (Denver, western mountain states) in which the background radiation levels are well in excess of the average radiation exposure for the entire nation. The models used in the evaluation of doses and associated health effects in the EIS do not assume any threshold level for health effects due to radiation exposure. The health effects estimators used in the EIS have been applied in a linear manner, implying that health effects are proportional to the dose, no matter how small the dose.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BA-5	The most frightening pollution produced at the Savannah River Plant is the disposal of high- and low-level radioactive wastes. High-level wastes from fuel reprocessing emit highly acid and alkaline substances which make disposal difficult. Leaks definitely have been taking place of high-level waste. Knowing that the Savannah River Plant is storing over 30 million gallons of liquid high-level waste, how can 500,000 gallons more waste each year be allowed to be stored? In 1982, Savannah River Plant officials reported some contamination of ground water. The longevity of radioactive waste allows it plenty of time to seep into the aquifer. The Defense Waste Processing Facility sounds like it will help solve the waste disposal problems. Until then, however, it would behoove us to use the money for the L-Reactor restart to clean up present waste and contamination.	DOE has written four Environmental Impact Statements and one Environmental Assessment on SRP's high-level radioactive waste activities within the last six years. A program is presently underway at SRP that is transferring all high-level waste into new Type III double-steel walled storage tanks which have not evidenced any leakage. During the storage of high-level waste in older type tanks, only one tank--Tank 16--experienced cracks that allowed some waste to leak into the soil. Waste material from this tank has been transferred to a newer Type III waste tank. Over 60 monitoring wells have indicated that the waste has migrated only a few feet from the tank. As documented in DOE/EIS-0082, DOE is committed to a major program to provide a more permanent storage mode for high-level waste. Site preparation work at SRP has begun on the Defense Waste Processing Facility which will immobilize the high-level radioactive waste in borosilicate glass and store the glass in steel containers for eventual shipment to an offsite repository. Low-level wastes generated at the SRP are buried at an onsite burial ground that has been monitored extensively since operations began in the 1950's. Releases have been confined to the burial ground and its immediate vicinity. The Tuscaloosa aquifer is not subject to contamination since a hydraulic gradient head reversal occurs that greatly limits the depth of circulation of water from the burial ground.
BA-6	Since our wetlands have been disappearing rapidly, it is no small matter that 1000 acres of wetlands will be impacted. The elimination of some of the habitat for the American alligator, waterfowl and wood stork cannot be tolerated. It is bitterly ironic that in order to defend our country we must subject our people to the very effects of radioactivity we are trying to avoid. When we can destroy ourselves so many times, the need for more weapons is dubious. We are planting the seeds of genetic damage with radioactive pollution. I strongly believe we ought to start thinking of our children and the generations of people we will never know before doing anything so foolish as restarting the L-Reactor.	The EIS describes impacts to wetlands, the American alligator, waterfowl, and the wood stork in Section 4.1.1.4 from direct discharge, and Section 4.4.2 and Appendix I discuss cooling-water mitigation alternatives and impacts to wetlands. Section 5.2.4.1 of the EIS compares wetland losses for the coterminous United States, as well as those for Georgia and South Carolina, to those of the SRP. Section 7.3 of this final EIS presents the current status of DOE's consultations with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

STATEMENT OF MR. & MRS. JOHN P. SWAIN, IV

30 October '83

Dept. of Energy:

It is my belief that each generation is given responsibility for our world's "upkeep." We must all do our very best to keep our environment in the best possible condition, and better than it was when we came to it as our knowledge and technology make this possible. I don't believe any of us would want to leave our sons and daughters less than we were given.

BB-1 It is for these reasons I wish to speak up and insist that your facilities comply with federal and state environmental standards applicable to commercial reactor sites.

See the responses to comments AA-3 and AF-1 regarding DOE's commitment to comply with applicable Federal and state environmental regulations and the differences between SRP reactors and commercial light-water reactors.

BB-2 I urge you to accept your share of the responsibility for our environment and take a thorough look at all possibilities of damage and avoid it before startup--specifically now of the L-Reactor.

See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state environmental regulations and to take all reasonable steps to mitigate impacts.

Use all feasible protection measures and keep searching for more. Don't take chances that may lead to uncorrectable mistakes.

Our quality of living depends on it!

Thank you,

Mr. & Mrs. John P. Swain, IV
707 Corley St.
Lexington, S.C. 29072

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MRS. JUDITH G. CATOE		
	2535 Treeside Drive Columbia, South Carolina 29204 October 26, 1983	
	Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801	
	Re: Comment on L-Reactor Startup	
	Dear Mr. Sires:	
	I wish for my comment on the L-Reactor startup to be for the record.	
BC-1	First, I feel that startup should not occur until steps are taken to avoid damage to the environment.	See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state environmental regulations and to take all reasonable steps to mitigate impacts.
BC-2	Second, I feel that DOE facilities should be required to comply with federal and state environmental standards that are applicable to commercial reactor sites.	See the responses to comments AA-3 and AF-1 regarding DOE's commitment to comply with applicable Federal and state environmental regulations and the differences between SRP reactors and commercial light-water reactors.
	Very truly yours,	
	(Mrs.) Judith G. Catoe	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MR. AND MRS. CHARLES F. COOK		
829 Wheelchel Drive Decatur, GA 30033 October 29, 1983		
Mr. M. J. Sires III Assistant Manager for Health, Safety and Environment Savannah River Operation Office		
Dear Sir:		
8D-1	We are Georgia citizens who are very much concerned about our environment and about the health and safety of people in the Savannah River Plant area.	DOE is concerned with the health, safety, and environment of people in the Savannah River Plant area. DOE will comply with all applicable Federal and state statutes and regulations on environmental and health protection. Regulations and requirements that are applicable to the resumption of L-Reactor operation are summarized in Chapter 7 of the EIS. DOE also has and will continue to maintain an intensive surveillance program to monitor the health and safety impacts of its actions, both onsite and offsite, as discussed in detail in Chapter 6. Section 5.2 describes the cumulative impacts of L-Reactor operation in conjunction with the effects from other SRP facilities and from major facilities near the Savannah River Plant.
We are opposed to the starting up of the L-Reactor operation at the Savannah River Plant.		
Mr. and Mrs. Charles F. Cook Decatur, Georgia		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF BILL CARROLL		
Bill Carroll 630 Lewisham Road Columbia, S.C. 29210 30 October 1983 Sir:		
BE-1	The hands that are typing this letter have fired, in training exercises, using inert warheads, and stopping the propagation of the launch signal prior to the EBW circuit, at least 1,000 Polaris and Poseidon missiles in the fourteen years I was active as an engineer in that program. At core all I want to tell you is that for you to consider restarting the "L" reactor at SRP is, in a word - sick! A SINGLE Poseidon missile launched from a square in the Aegean Sea and programmed to fly northeast from the Volga delta in the direction of its junction with the Kama could extinguish the following cities: Astrkhan, Vogograd, Kamyshin, Sarutov, Syzran, Kazan, Votkinsk, Krasnokamsk, Perm and Berzniki - this would incinerate the industrial core of the Soviet Union and render it an impotent economic and social entity. For you to suggest that a SINGLE Poseidon submarine could not repeat this operation 16 times is to flatly lie! I know, and you don't know what those missiles are capable of doing - I've taught classes in those weapon systems, you have not and in all probability never will be able to - probably lack the discipline and intelligence requisite to learn anything seriously technical. In a word to say that starting up that reactor is in some sick way associated with making this country a more secure area of the planet in which we live is a raw lie.	These comments are outside the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BE-2	The potential for contaminating the Savannah River with cesium is very real - to risk activation of that potential is flatly a clear case of criminal irresponsibility. I have two teen-aged daughters who have every right to become 21....things like you and other monsters associated with the Departments of Defense and Energy jeopardize their chances....a fact about which we in the peace movement are continually stunned. Little doubt in my mind that this letter, along with other complaints about your arrogant attitudes in regards to those of us who love our children and the land on which we live, will be trashed and characterized as yet another silly blatch from a peace freak. That will probabli, happen but know this: (1) I am an honorably discharged ex-naval officer who made some significant sacrifices for you and your family - I have a naked and just right to complain; (2) in October of 1972 the hands that are typing this letter helped to carry a young trooper to a military hospital - he was nineteen - his legs had been blasted off his body - by a mine - in Vietnam! The military aristocracy whom you serve took his legs away from him. You really should think about that. If you should see your children dying, gagging on their own vomit - be assured that you were definitely in the cause chain that was responsible for their horrible deaths. I may be witness to the same horror with regard to my own children but at least I'll know something that you don't; namely that when it became clear to me that I was in the cause chain I quit and began to fight against those whom I had so faithfully served. I doubt if you have the intelligence and courage to do what I did - additionally you might be deterred because you can't find any other kind of work besides being a part of a huge machine that generates lies.	See the response to comment AA-2 regarding the relationship of radiocesium and radiocobalt concentrations to EPA drinking water standards.
	Peacefully,	
	Bill Carroll	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF BEATRICE D. JONES		
BF-1	The issue of cumulative low-dose radiation is one in which many people in South Carolina and Georgia have particularly high stakes. The D.E.I.S. makes it abundantly clear that restarting the L-Reactor will substantially increase the radiation dose to the public from numerous sources.	The EIS states that the operation of L-Reactor and associated support facilities will increase the dose to the population within an 80-kilometer radius by 17.2 person-rem and the dose to downstream consumers of Savannah River water will increase by 18.6 person-rem, a combined total of about 36 person-rem. This dose is only about 0.03 percent of the natural radiation dose received by the population living within an 80-kilometer radius and the Beaufort-Jasper and Port Wentworth drinking water population in 1 year. This is equivalent to saying the population dose from L-Reactor operation will be equivalent to about 3 hours of exposure to natural radiation.
BF-2	It appears that few in government ever questioned by what right, legal or moral, the Department of Energy through its Savannah River Plant operations has been permitted to pollute the air we breathe with radioactive contaminants, the soil in which our food is grown, our water and our wildlife.	As stated in the EIS, DOE will comply with all applicable Federal and state environmental protection regulations that are summarized in Chapter 7 of this EIS. Also see the response to comment AA-3 regarding compliance with applicable regulations.
BF-3	It seems less likely that this would have occurred, at least to the extent that it has, if the promoters of this hazardous technology were not also its monitors. It is a situation that needs to be remedied. There are many complexities involved in assessing the risks to man from low-level ionizing radiation, but nuclear pollution can and should be reduced to a large extent at the Savannah River Plant, and never denied or belittled with half-truths about its consequences.	As discussed in Chapter 6 of the EIS, DOE has maintained and will continue to maintain an intensive surveillance program to monitor the composition of effluents from the SRP facilities, to measure radioisotope concentrations in the Plant environs, to assess the ecological health of the overall SRP environment, and to determine SRP compliance with applicable standards. The results of these monitoring programs are reported annually to the public. As also pointed out in Chapter 6 of this EIS, several state and Federal agencies also monitor SRP activities and participate in various studies; these include the Georgia Department of Natural Resources (radioanalysis of fish near SRP and crabs and oysters near the seacoast and monthly analysis of 13 water-quality parameters), South Carolina and Georgia (air-monitoring network, including eight sampling stations near SRP), U.S. Geological Survey (continuous monitoring of river flow and temperature above and below the SRP), National Centers for

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		Disease Control (epidemiological studies), and the Academy of Natural Sciences of Philadelphia (long-term aquatic and water-quality studies in the Savannah River near SRP). The current reports documenting the radiation monitoring programs of the states are <u>Environmental Radiation Surveillance Report, Summer 1980-Summer 1982</u>, Georgia Department of Natural Resources, and <u>Nuclear Facility Monitoring</u>, South Carolina Department of Health and Environmental Control. Proposed EPA standards for radioactive air pollutants are acknowledged to be well below "safe" limits; the development of these standards was based on SRP's existing best available control technology practices. DOE performs several monitoring studies in compliance with both state and Federal permit requirements. DOE has also initiated a 2-year program to determine the environmental effects of cooling-water intake and discharge of the SRP production reactors. The States of South Carolina and Georgia, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers are participating in this program.
M-103 BF-4	Recently, while reading the April 18 - July 17, 1983 Hearing Report I came across the statement of a DuPont official. A part of his statement said that offsite radiological impact of the Savannah River operations is less than one percent of normal background. It struck me from things that I have read that his statement may be misleading as well as confusing to the public, since there is no reason to dismiss as negligible any radiation dose from a man-made source simply on the grounds that the dose it delivers is lower than the dose from some combined sources of normal background radiation.	Natural radiation exposes the entire population of the world and has done so since mankind has existed. The effects of man-made radiation do not differ in any manner or degree from the effects of natural radiation. Thus, radiological impacts of nuclear operations are often compared with natural radiation exposure. The intent of the statement that the population dose from the reference case L-Reactor operation would be only about 0.03 percent of natural radiation exposure was included to show that the radiological impact will be very small. The radiological effects of L-Reactor operation are also much smaller than the variation in natural background radiation from one place in the United States to another, or even from one place to another in South Carolina.
BF-5	The Department of Defense started issuing false assurances about radiation in the early 1950's when fallout from American and Soviet bomb testing began to pollute the world. Many false assurances continue today at the Savannah River Plant.	<u>The Department of Energy has not concealed in the past nor will it conceal in the future any information concerning the radiological effects of plant operations on the public.</u> All assurances by DOE concerning radiological effects are based on monitoring data or analytical predictions based on recognized models and guidelines.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BF-6	I believe I can say without fear of contradiction, that people in South Carolina and Georgia who have taken the trouble to inform themselves as best they could about the Savannah River Plant, are strongly opposed to having their families, themselves or any others become casualties of the D.O.E.'s codified permissible radiation doses, especially when much of it could be mitigated, or even avoided. No standard implies a safe amount of radiation.	The Department of Energy's radiation protection standards are comparable to those of the Nuclear Regulatory Commission (10 CFR 20) for a production facility (i.e., 500 millirem to the whole body in any one calendar year). These standards have been promulgated by the National Council on Radiation Protection (NCRP) and the International Commission on Radiological Protection (ICRP). The National Academy of Sciences BEIR Committee (<u>The Effects on Populations of Exposure to Low Levels of Ionizing Radiation: 1980</u>, National Academy of Sciences, Washington, D.C., 1980) has stated that it cannot determine if the low levels of radiation such as those that will result from L-Reactor and other SRP operations are, or are not, detrimental to man. Thus, the committee conservatively assumes that radiation-induced health effects will occur at all levels of exposure. The risk of health effects at low levels of exposure is extrapolated from observations at high levels of exposure. This approach is taken in the EIS (Appendix B) to calculate the health effects from L-Reactor operation. The EIS states that for the reference case the maximum annual health effects expected in the population living within an 80-kilometer radius and in the downstream water-consuming population from the operation of L-Reactor and its support facilities will be 0.005 excess cancer death and 0.009 excess genetic disorder. This level of health effects will not be detectable statistically in these populations, where the natural cancer death rate currently is about 650 per year and the natural fatal genetic effect death rate is about 100 per year.
BF-7	The Savannah River Plant's acting manager said in a 1980 interview that trying to build an air-tight canopy over an old reactor "is not worthwhile in my view." I agree, it is one of the reasons the L-Reactor should never have been renovated, but since it has, and present day nuclear reactor safeguards dictate the need for a containment dome, one should be installed. From a scoping letter I learned that the Reactor Engineering Division of the Savannah River Laboratory has advanced proposals and designs for containment domes over the years, and that proposals were turned down on the basis of cost.	Commercial light-water nuclear reactors have containment domes because of the need to confine high-energy releases during a potential loss-of-coolant accident from the high-pressure (greater than 2000 pounds per square inch), high-temperature (greater than 500°F) primary coolant. L-Reactor is a heavy-water-moderated reactor and not a commercial nuclear reactor; its design is different from that of commercial light-water reactors. The heavy-water moderator also serves as the reactor coolant. The maximum moderator temperature is 212°F and the moderator is pressurized by a 5-pound-per-square-inch overpressure.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Excessive considerations of expediency and cost effectiveness have consistently been allowed to override proper considerations of the public health and safety.	Engineered safety features for nuclear reactors vary according to the different types of reactors. For example, the Fort Saint Vrain commercial nuclear power plant in Colorado licensed by the NRC has no containment dome, but has alternative safety features that NRC considers to be adequate. Similarly, L-Reactor has an alternative safety system, confinement, which serves a similar purpose as containment. The Savannah River Plant reactor confinement system filters all air leaving the reactor building; it traps particulates and radiiodine in the event of an accident. Although noble gases (e.g., krypton) and tritium would not be trapped, the offsite radiation dose would be within radiation protection guidelines and, as indicated in Section 4.2.1.4 of the EIS, would represent a very low risk to the public health and safety because of the long distance to the SRP boundary.
	Containment domes could and should have been put in place long before now. Obviously some engineers in the Savannah River Laboratory must have thought they were needed. The time has come for government to stop placing a low dollar value on human lives.	DOE has not refused to consider the desirability of containment domes. The Department has funded containment investigations since the 1960s. A major investigation that began in 1979 is used as a basis for safety-system alternatives discussed in the EIS (see Section 4.4.1).
		The safety system mitigation alternatives identified in the EIS are for the mitigation of potential consequences from hypothetical reactor accidents, which have a very low estimated probability of occurrence and associated risk. Based on benefit, cost, and technical feasibility, this EIS has identified the reference case confinement system as the preferred safety system alternative.
		Finally, the NRC rule on the backfitting of licensed commercial reactors also requires interpretation and judgment similar to that to be exercised in the EIS selection process on improved confinement or containment. This rule (10 CFR 50.109) states:
		"The Commission <u>may</u> ... require backfitting of a facility if it finds that such action will provide <u>substantial</u> , additional protection which is <u>required</u> for the public health and safety or the common defense and security (emphasis added)."

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BF-8	Eighteen or more years ago the old U.S. Atomic Energy Commission made the observation that "even reactors that make bomb ingredients should be operated under the same basic safety criteria that are presently applied to licensed reactors," the AEC's advisory committee on reactor safeguards told the Commission. It seems pertinent to mention that a number of reports were opened to the only reporter allowed access to S.R.P.'s nuclear safety documents. One 1966 document noted that DuPont's reactors were considered inherently safe since their cooling water flowed at much lower temperatures and pressures than those anticipated in the electrical generating plants then still on the drawing boards. "Hence," the report states "they were not provided with containment enclosures." Interestingly, in 1977, eleven years later the Savannah River Plant released a diagram of its reactors for the first time as part of an E.I.S. statement. The reactor building was--misleadingly--labeled "containment building."	The Savannah River Plant and, therefore, L-Reactor is a DOE-owned, contractor-operated facility. Section 110(a) of the Atomic Energy Act, as amended (42 U.S.C. 21240a), excludes this type of facility from NRC licensing requirements. DOE is responsible for regulating and has established its own comprehensive health and safety programs for its own facilities (see Section 7.8). The radiation protection standards of DOE are comparable to those of the NRC (10 CFR 20) for a production facility (i.e., 500 millirem to the whole body in any one calendar year).
BF-9	The D.E.I.S. states that atmospheric releases containing tritium, carbon-14, krypton-85 and iodine-129 will be released from the L-Reactor and its support facilities. The D.E.I.S. also states that there are studies in progress to determine the effectiveness and feasibility of using solid absorbents for absorption of noble gases. It would be in the best interests of South Carolinians and Georgians that the D.O.E. give serious attention to the installation of equipment for the removal of krypton-85. Their program to "assess the technical feasibility and economic practicality" has the familiar sound of lame excuses for not installing environmental protection measures because "more research is always needed." The necessary technology for krypton-85 collection, containment and storage has been available for some time.	One of the reactor safety system alternatives discussed in Section 4.4.1.3 is a low-temperature adsorption system; this would be an addition to the existing airborne confinement system. The system uses a hydrogen mordenite (a form of zeolite) adsorbent to trap noble gases (krypton), a silver mordenite adsorbent to trap iodines, a combination hydrogen recombiner-chiller, and a molecular sieve to remove bulk moisture and tritium. Experimental research is in progress to determine the effectiveness and feasibility of the low-temperature adsorption technique. Approximately two years will be required to complete the program. A caustic scrubber is not needed in conjunction with the silver mordenite. Caustic scrubbers would be necessary only if the air flow contained high concentrations of nitrous oxides.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Similar action should be taken for iodine-129 which is of particular interest because of its 17 million year half-life, and its ability to enter the food chain and subsequently concentrate in the human thyroid. Because of its long half-life discharged iodine-129 becomes a permanent contaminant in the environment, and as a result represents a long term public health problem. I understand that an improved iodine removal system consists of a caustic scrubber followed by a highly efficient silver zeolite absorber. As a layman I don't pretend to understand all the technical aspects of these systems, but I have a fair idea of what it could mean in terms of greater iodine efficiency removal.	
8F-10	Many people have responded in a meaningful way to the Energy Department's hearings. This happens to be my fourth, and I hope, the last. The public responses for the most part contained information which indicated they had done their homework, even though handicapped by a lack of information to which the D.O.E. has access. Intelligent, sensible suggestions have been offered, and for all practical purposes you might say that demands have been made. It remains now to be seen if the Department of Energy plans to rectify with constructive action the most prominently identified needs for containment domes at all reactor sites, the installation of cooling towers, and mechanisms supplied for recycling discharge waters.	The EIS explicitly identifies the methodologies used and the scientific and other sources of information relied on for its conclusions; it is based on comprehensive environmental information drawn from more than 100 publicly available documents developed over the last 30 years. The public has access to all pertinent unclassified information and reference documents supporting the EIS in the DOE Public Reading Rooms in Aiken, South Carolina, and Washington, D.C. In addition, annual monitoring reports and scientific papers produced as the result of research conducted at SRP are available in open scientific literature. Also see the response to comment AT-3 regarding preparation of this EIS, the response to comment BF-7 regarding containment domes, and the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives.

Beatrice D. Jones
The Heritage
1829 Senate Street
Columbia, SC 29201

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Statement by Dr. Mary T. Kelly, First Vice-President and Natural Resources Coordinator for the League of Women Voters of South Carolina, Draft Environmental Impact Statement Hearing for the L-Reactor Operation, Savannah River Plant, Aiken, S.C., November 1, 1983.	
	I am Mary T. Kelly, representing the League of Women Voters of South Carolina. We are one of the groups that sued to force the Department of Energy to prepare an Environmental Impact Statement under the provisions of the National Environmental Policy Act of 1969. We believe that the starting up of the L-Reactor is a major environmental impact and an essentially new activity because of the extensive rebuilding.	
	I would like to thank Senators Hollings, Thurmond and Mattingly and their staffs for their interest and assistance. I would also like to thank the Department of Energy and DuPont representatives for their unfailing courtesy throughout these hearings in dealing with those of us with whom they do not always agree.	
BG-1	As a organization dedicated to the informed participation of citizens in their government, we think that much has been achieved through the process leading to this EIS. However, we are even more aware, after trying to come to grips with the document, of the need for more time to permit review by experts, and the need for the development of information in certain areas. We hope that DOE in the future will not try to short cut the process mandated by the National Environmental Policy Act.	The Department followed the Council on Environmental Quality regulations [40 CFR 1506.10 (c)] for the comment period on the Draft EIS. The Energy and Water Development Appropriations Act, 1984, allowed the Secretary of Energy to reduce the comment period to 30 days. The Secretary chose not to exercise this option and allowed the full 45-day review period as requested by several comment letters submitted during the scoping period.
BG-2	One of the most important elements of an EIS is the assessment of need. We are well aware, and sympathetic with, the need for security. However, we think a report could have been done for public consumption by those with security clearance. Even in the top levels of government, there is not total unanimity on weapons production. A totally blank Appendix A for public consumption is not acceptable.	See the response to comment AB-2 regarding disclosure of quantitative information on need.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BG-3	We believe that the Savannah River Plant should comply with all state and federal environmental laws, as do commercial nuclear power plants and nuclear operations. Given the magnitude of this (SRP) operation and the size of the military budget, this is a most reasonable expectation. A better informed public is no longer willing to accept threats to health and safety and environmental degradation with potential for tremendous negative impact. We in South Carolina and Georgia are very concerned about the ground water contamination caused by practices which scientists of the caliber employed at SRP should never have permitted. Now that information is available to the public and to the state regulatory agencies, we not only expect but demand that this federal agency cease to contaminate and proceed to cleanup.	See the responses to comments AA-3 and BF-7 regarding DOE's commitment to comply with applicable Federal and state regulations and the differences between SRP reactors and commercial light-water reactors.
BG-4	The information contained in the draft EIS seems to point to the fact that seepage basins will continue to be a form of liquid waste disposal. This method should be discontinued. We know about the contamination due to halogenated hydrocarbon cleaning fluids, but radioactive and metal contaminants are also a threat. According to the Columbia Record of Thursday, October 27, 1983, the U.S. Senate, through the request of Senator Thurmond, has authorized the transfer of \$30 million dollars to clean up ground water contamination in the M area. Chances of real success are not certain. Yet the Draft EIS tells us that when the L-Reactor starts withdrawing from the Tuscaloosa aquifer, the downward differential in the M area will be increased, and the upward head differential in the H area will be reduced to zero. It would seem that until the groundwater problems are cleared up, the L-Reactor should not start operation.	Existing and potential L-Reactor-related ground-water contamination is related to the use of seepage/settling basins. The disposal of liquid radioactive and nonradioactive wastes via seepage basins has been used at SRP as an alternative to direct discharge to onsite streams. Seepage basins reduce the dose to users and consumers of Savannah River water through radioactive decay during the protracted time it takes ground water to travel through the unsaturated zone to the water table and then to seep line springs along onsite streams. For certain radionuclides and nonradioactive pollutants, the travel time is slowed even more by adsorption and ion-exchange processes along the travel path. In addition, this method of waste disposal has reduced the accumulation of radioactive and nonradioactive pollutants in stream, swamp, and river sediments and in biota. Impacts associated with the use of seepage/settling basins are discussed in response to comment AJ-1. Sections 4.1.2.2, 5.1.1.2, and 5.1.1.4 have been updated with current information on discharges to seepage/settling basins and provide an expanded discussion on impacts from their use. As noted in the opening remarks to the public hearings on the L-Reactor EIS, DOE is committed to several items related to on-site ground-water monitoring and mitigation at SRP, including (1) continuing an expanded program of ground-water monitoring and study; (2) involving the State of South Carolina in onsite and offsite ground-water monitoring activities; and (3) taking mitigative actions to reduce pollutants released to the ground water and establishing a mutually agreed-on compliance schedule for mitigation efforts. Current plans call for discontinuing the use of the M-Area seepage basin and constructing a process wastewater-treatment facility by April 1985. The treated process water would be discharged to an onsite stream under an NPDES permit.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		Alternatives to the use of the L-Reactor seepage basin are discussed in Section 4.4.3. The use of seepage basins elsewhere on SRP is being considered on a sitewide basis. A draft "SRP Ground-Water Protection Implementation Plan" was developed recently to examine strategies and schedules to implement mitigative actions, including the closing and decommissioning of the SRP seepage basins under its hazardous waste programs; mitigative actions will be compatible with the State of South Carolina's hazardous waste management regulations. This implementation plan is summarized in Appendix F of this EIS.
BG-5	Information provided by Mr. Arthur Dexter in his letter of August 3, 1983, to Mr. Sires needs to be taken very seriously. I do not believe the questions raised about radioactive iodine release have been adequately answered, nor the need for containment structures negated by the information in the EIS.	All comments received during the scoping period were considered, and several sections were specifically written in the EIS to address Mr. Dexter's comments. Also see the response to comment letter CW, a letter from Mr. Dexter, in this appendix.
BG-6	In particular, my copy does not contain a section 6.3.1.3 as referenced on p. K-75.	The reference on page K-75 referring to Section 6.3.1.3 should read Section G.3.1.3. This typographical error has been corrected in the EIS.
BG-7	South Carolina and Georgia need to be extremely concerned about emergency response plans and procedures. The impact of the Savannah River Plant cannot be limited to a small radius.	See Appendix H, which has been revised to reflect comments received on the Draft EIS.
BG-8	There has been no assessment of the effects of transportation of materials to and from the Savannah River Plant as a result of the added burden due to L-Reactor operation.	Section 4.3 describes the effects of the transportation of materials to and from the Savannah River Plant due to L-Reactor operation. Also see the response to comment AY-10 regarding the assessment of transportation effects.
BG-9	When South Carolina, in the wake of Three Mile Island, examined the emergency response mechanisms in place for a major nuclear accident at a commercial power plant, it became very clear that coordination between reactor operators, state and county officials, and Civil Defense, was an unworkable, underfunded, and badly organized mess. I am not convinced, even having read Section H, that emergency response for an accident with impact beyond a small restricted area under the direct control of DOE-SRP personnel, is in much better shape at this time. It is clear from the summary on p. H-17, that planning is still incomplete. A serious, almost incredible omission is the failure to acknowledge and plan for a military contingency, caused by an enemy or terrorist attack. Surely, the impact of this would be beyond SRP's boundaries, and the responsibility not solely that of state or local officials.	See the response to comment AY-11 regarding emergency response planning. DOE-SR has plans for responding to terrorist attacks on the SRP. These plans are developed and exercised as part of the Plant's Safeguards and Security Plans. The general emergency response plans that are already operational for a comprehensive range of emergency situations at the county level and the more specific radiological emergency response plans for state and Federal agencies provide an adequate base for responses to terrorist attacks. This same base of emergency resources applies in the commercial industry for licensed nuclear power plants.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BG-10	We continue to support the stand of the SC Department of Health and Environmental Control in refusing to permit degradation of the state's water quality standards for Steel Creek. We thank you for the opportunity to make these remarks. We would like to reserve the right to add additional comments in writing until the comment period ends.	Disasters caused by direct military actions are not used as a basis for emergency planning for nuclear facilities in the United States. The response to such actions would fall under general civil defense planning. In the development of the emergency planning zones, DOE considered the potential for expanding or otherwise modifying its zones based on a range of emergency occurrences. While the actual emergency planning zone represents worst-case predictions calculated for a 3-percent core-melt, the Contingency Planning Zone was designated to ensure that adequate levels of planning were completed (at least) to a 10-mile radius. See the responses to comments AA-1 and AA-3 regarding cooling-water alternatives and DOE's commitment to comply with applicable Federal and state regulations.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
Testimony of W. F. Lawless, Nov. 1, 1983 before the L-Reactor Draft EIS public hearing		
BH-1	A. I want to applaud the DOE-Savannah River on the data listed in Appendix F, Vol. II of the draft Environmental Impact Statement L-Reactor Operations, Savannah River Plant, USDOE Draft Rep. DOE/EIS-0108D, Vol. 1 & 2 (1983). The information has heretofore not been found in the open literature. No conclusions have been drawn in either Vol I or Vol II on this data so I would like to offer the following:	Earlier documents (e.g., Langley and Marter, 1973) described the subsurface hydrology and water use at SRP and the surrounding area. In Appendix F of the EIS, the discussion of the relative piezometric heads in the subsurface formations beneath SRP includes information developed since the publication of the Environmental Assessment on the proposed restart of L-Reactor. Most of the ground-water quality data presented in Section F.5 and elsewhere in the EIS represent monitoring information acquired under the RCRA compliance program recently formulated by DOE. Ground-water monitoring data for the RCRA facilities are provided to SCDHEC on a quarterly basis. DOE has published site ground-water monitoring for radionuclides in the annual reports, <u>Environmental Monitoring at the Savannah River Plant</u> (e.g., DPSPU-79-302). As noted in the response to comment AJ-1, the EIS provides extensive discussions of the ground-water regime at SRP and of potential impacts to the ground waters beneath the SRP from the operation of L-Reactor and its support facilities.
BH-2	Of 500 monitoring wells at the SRP plant, detailed data is herein available only on eleven wells up and downgradient around F and H seepage basins (radioactive) over a period of just one year. The data lists approximately 45 categories of pollutants or pollutant signatures. Of these, 29 categories have listed or associated drinking water standards (DWS). Of the DWS standards, 100% of the wells break at least one standard, or stated another way, drinking water standards are broken in about 10 of 29 possible categories over 40 times. The drinking water standards are broken for Fe, Mn, Hg, Pb, NO₃, gross alpha, Ra, Cr, and iodine. Interestingly, the gross beta contamination in these eleven wells ran to an incredible 8 rem/year, and although the plutonium nuclides are stated to be locked in the soil, gross alpha did exceed a drinking water standard in a downgradient well.	Potential impacts to the ground waters beneath the SRP are conservatively assessed in Sections 4.1.1.3, 4.1.2.2, 4.4.3, 5.1.1.2, and 5.1.1.4 of the EIS. The monitoring well data presented in Appendix F characterize the present environment and reflect past waste management practices. The data for the F-Area seepage basin monitoring wells show that the nonvolatile beta concentration ranged to 8 microcuries per liter. Because this is a controlled area, no one will be exposed to this contamination; thus, the reference to dose rates (rem/year) is incorrect. No drinking water wells produce from these areas of shallow ground water that have been contaminated. Contaminants that seep into the ground water in the Separations area will not reach offsite ground-water users (Section 5.1.1.2). Improvements in liquid waste disposal are continually being made at SRP. Contaminant loads to seepage basins have decreased over the past several years.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BH-3	Special attention in Vol. 1 was drawn to mercury pollution (5.1.1.2, Table 5-3, Vol. 1) surrounding the F and H radio-active seepage basins, but not the fact that the drinking water standards of 2 ppb were broken on the average by a factor of 10 in the downgradient wells increased to a factor of 15 with L-Reactor in operation. The single highest reading was over 27 times the drinking water standard in one well that is also indicating rapidly increasing readings.	See the response to comment BH-2 above. Significant decreases in releases of mercury to seepage basins have occurred since 1971; the small increases in mercury discharges related to L-Reactor operation will not approach pre-1971 levels. The discussion in Section 5.1.1.2 directs the reader to Appendix F, which compares the measured levels of ground-water contamination with EPA drinking-water standards.
BH-4	Questions resulting from this information are: 1. How long will these standards be broken after plant operations cease? 2. Will this area surrounding F and H seepage basins be recoverable or must it and other plant areas be impounded for perpetuity? 3. What will it cost to repair the damage done and the damage proposed by the L-Reactor restart once plant operations cease?	See the response to comment BG-4 regarding DOE commitments for ground-water protection.
BH-5	Dupont document DPST-77-444 (1977), <u>New Criteria For Seepage Basin Use</u> , by W. L. Marter notes the hundreds of years needed before seepage basin radiation levels decay to inhabitable levels. This document should be included as a companion reference to the Fenimore-Horton DPST-72-548 (1972) reference on the radioactive seepage basins.	The EIS has been modified to include a reference to Marter, 1977 (DPST-77-444).
BH-6	B. <u>ERDA EIS 1537, Waste Management Operations, Savannah River Plant</u> , has been liberally referenced in this L-Reactor draft EIS, but the companion and subsequent EIS on SRP <u>Waste Management Operations, High Level Waste Radioactive Storage</u> , Final EIS, USDOE Rep. DOE/EIS 0062, has not been referenced. EIS 0062 was written to review the SRP high level waste tank safety and it speaks of major design changes in the new generation of SRP high level waste tanks and of enlightened Dupont quality assurance construction procedures. EIS 0062 also spoke of the insignificance of pitting corrosion. What has been the SRP pitting corrosion experience for these new high level waste tanks?	DOE/EIS-0062, which is a supplement to the general waste management EIS for SRP, ERDA-1537, presented the environmental information from which DOE reached a Record of Decision that the new double-wall, high-level waste tanks now in use at SRP are environmentally acceptable; this document is part of the SRP NEPA record and has been referenced in the EIS. As alluded to in the comment, some of these tanks did suffer pitting corrosion when they were temporarily floored with plywood during construction. The reports referenced in the comment expressed concern that this corrosion might limit the lifetime of these tanks, although the referenced independent evaluation by A. D. Little concluded that the tanks could safely enter service.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Two reports, one by Dupont (<u>Investigation of Pitting in Primary Bottom Plates of Type III Waste Tanks, DPE 3687 (1981)</u>) and the other by A. D. Little (<u>The Effect of Corrosion Pitting on the Integrity of Radioactive Waste Storage Tanks 38 to 51 at the Savannah River Operations (1981)</u>) have been published on the HLW waste tank corrosion pits and they should be referenced in this draft EIS. W. F. Lawless Oct. 31, 1983	The waste chemistry is closely controlled to prevent pitting. The cited documents have been added to the collection in the DOE Public Reading Room in Washington, D.C., and Aiken, South Carolina.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MR. WILLIAM McDANIELS		
BI-1	My name is William H. McDaniels, and I live in Aiken, South Carolina. I've only lived here about a year, but some of the things here in regards to this L-Reactor deeply disturb me due to the fact that I have worked in the field of ecology in my spare time since the late 1940's. I am with the Sierra Club, but I am representing the National Council of Senior Citizens Organization in Washington, D.C., which I am starting a chapter in the State of South Carolina. In reference to some of the things that I read here, I feel, first of all, we don't need to produce more plutonium. I feel that we should try to sit down and reason together as far as the countries that we feel are evil nations, or whatever. We are all human beings. I feel we should work harder for peace. We seem to be driving a wedge between peace that probably will never prevail again. "When the age of Industrial" -- this is from a book here on future survival. I'll just read part of it here. "When the age of industrialization came, it seemed to promise man a utopia, the way to improve the quality of life on earth. The need for fuel necessary to run this industrial complex can be the very thing that will destroy man as it eats up all of his natural resources. The human animal is the only animal that fouls its own nest." Quoting from a book on radiation, <u>Radiation in Human Health</u>, by John W. Hoffman, M.D., Ph.D., I'll reference a chapter here, Chapter 5, of a young man who's 24 years old. He's asking questions here. It says there is no better way to determine practicable applications of the whole body cancer, that the dose value -- which we now have available in Tables 21 and 22 to ask a number of concrete questions, the kind of questions which came up again and again bleakly medical and legally and from the general public. It's interesting, the radiation hazards.	See the response to comment AB-2 regarding information in the EIS on need and production alternatives.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Question No. 1: "I am an industrial photographer working with the gamma ray source through a malfunction in equipment. The source was still present when I moved to an unshielded area. It was estimated that I received 78 rads" -- short for radiation -- "by my 24th birthday." Of course, he refers to himself as a male sex. "Is my risk of developing cancer increasing with exposure? Just how much? If I do develop cancer from this radiation, by how much will my life be shortened on an average?" The answer is, "The risk of cancer somewhere in the body is certainly increased in exposure. We can analyze just how much in the following manner: Exposure from the beginning in the 24-year-old life, the whole body dose of 98 rads from Table 21, the whole-body cancer dose equals 200.9 percent rads per cancer." This is in reference to cancer. I was reading an article Senator Thurmond had in the Aiken paper. We all know that the contaminants from the L-Reactor, which was built in 1955, I think, and it was shut down in 1968, that it is down to the water table and has been down to the water table for all of these years, shortly probably after starting up the reactor in 1955. Our water table is very fragile, but like our ozones, it moves only two inches per 24 hours.	
BI-2	Now, we have some pretty concrete evidence that the water in all directions for 40 miles from the L-Reactor has been contaminated. I feel here that human lives are not taken under consideration as much as there's a possibility of big business trying to agitate or create wars, and this is what it's all about.	DOE is not aware of any ground-water contamination off the Savannah River Plant that has been caused by SRP operations. Radioactive constituents in municipal water wells in the SRP region are measured and the results reported in the annual reports, <u>Environmental Monitoring in the Vicinity of the Savannah River Plant (DPSPU-Year-30-1)</u>.
BI-3	I don't believe we need additional plutonium. I don't think we should arm ourselves any further. I believe in peace. I think we should sit down and start talking peace instead of invading islands and spreading ourselves out all over the world. I am also with the Sierra Club. I said here I'm not speaking for the Sierra Club; mostly I'm speaking as a concerned citizen in regards to part of these things I'm bringing out here.	See the response to comment AB-2 regarding information in the EIS on need and production alternatives.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Now, this book here, it's about <u>Radiation in Human Health</u>, a Comprehensive Investigation of Evidence Related from Low-Level Radiation to Cancer and Other Diseases, by John W. Hoffman, M.D.	
	I thank you for listening to me, but I am deeply concerned. I'm concerned about people that went out to demonstrate and the manner in which those people were put in jail just because they were going to come out and express their concerns. I am concerned, so that's the reason why I am saying I am a concerned citizen. I have been a concerned citizen; I will continue to be a concerned citizen.	
	I thank you.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MS. DORCAS ELLEDGE		
	I am Dorcas J. Elledge, a native South Carolinian. I'm from Columbia, South Carolina; and I'm here because I care about my own health and the health of my fellow South Carolinians and Georgians. I'm not familiar with the EIS Statement per se because I did not know or lost a message somewhere. I am only taking from Mr. Sires a comment or two.	
BJ-1	I do wonder that, after all this assessment of the situation, the two years for groundwater monitoring and all of that, if the L-Reactor will be started in spite of these things that need to be addressed now before it should be started. Are the citizens' comments and the study that was made going to fall on deaf ears or be ignored or become a voice in the wilderness due to what we are told is expediency in building nuclear weapons? This I do wonder about.	The purpose of the EIS hearings was to provide the public the opportunity to comment on the adequacy of the EIS and the merits of alternatives discussed in the EIS. DOE has considered all comments received at these hearings and during the 45-day comment period; responses are contained in this appendix. Transcripts of the EIS hearings and a record of all comments submitted have been placed in local libraries. The the need to restart L-Reactor and production alternatives are discussed in Sections 1.1 and 2.1, respectively, and in Appendix A (classified). The consequences of a delay of the L-Reactor restart is discussed in Sections 2.1.3.
BJ-2	The health and safety of the people of this state and of our neighboring state--and maybe if contamination of the ocean should occur; is this going to be sacrificed to build a weapon that could destroy us all but which, in the meantime, could maybe lead us to a slow death? I really am concerned about this, and I hope that the DOE will not let the expediency of building weapons take this precedent over the life and safety and health and safety of the people of South Carolina and Georgia.	DOE policy has always been to maintain and operate the SRP with the assurance that releases are as low as reasonably achievable and below applicable standards. The operation of L-Reactor will meet all applicable safety and environmental requirements. The health and safety of the residents of South Carolina and Georgia are of paramount importance to DOE.
BJ-3	One thing that I will also wonder about is: I have never heard to what degree on the Richter scale the buildings are built for, the reactor buildings are built for, at Savannah River	Section 4.2.2.3 describes hazards to L-Reactor from earthquakes. Probabilistic and deterministic analyses have determined that the maximum seismic hazard at the SRP is due to a

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BJ-4	Plant, to what degree they are supposed to stand or collapse. That would cause a great safety problem. I don't remember ever reading that, and I would like to know that in any future documents you might give.	magnitude 5.0 to 5.5 earthquake on the Richter Scale in the immediate vicinity of SRP or a postulated magnitude 6.6 earthquake near Bowman, South Carolina. In both cases, the expected peak free-field horizontal acceleration would be about 0.10 times that of gravity (0.10g). The design-basis earthquake peak acceleration for all SRP production reactors is 0.20g.
	I also am concerned about the location of the Savannah River Plant to possible enemy attack. I don't know, as Dr. Kelly pointed out, that this has really been addressed, either. We are a vulnerable state; and I think, if I were a worthy enemy, that might be the first thing I would want to hit. It could be a very, very catastrophic thing for this state and for this nation.	See the response to comment BG-9 regarding emergency response planning.
	I do believe that the citizens of this state do deserve first priority in their health and safety. It should be a first priority. It has been too long ignored. I am a registered nurse. I was in the Army 20 years, and I do know what bad health brings to all people. I would hate to think this would be the condition of the people of this state due to precautionary and preventive measures not being taken.	
	It seems to me we've done cleanup long enough. Let's do a little preventive work. I really feel that very keenly. I do hope the voice of the people would be heard on this issue because I think it's time. Thank you very much.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MR. JAMES W. HAMMOND		
	I'm Jim Hammond. I represent me. I spent 30 years with the DuPont Company. I didn't have much of a job there, didn't amount to much; but what I did was in safety and fire. It required that I go into most of the facilities once or twice a year there. After 30 years, I spent a good bit of time there. I didn't worry about cancer. If I had I'd have left here. I live within 20 minutes of the place; and if I was afraid, I'd leave. The Environmental Impact Study, seems to me, is very adequate. From working with DOE and AEC and the other agencies through the years, I've found all of them very sincere. They've made detailed studies of everything they've done out there. I think DuPont Company and DOE has all the capabilities and abilities and interests to protect the environment, the people. From my experience, L-Reactor should have been started on schedule. I know these people are sincere. At Michigan State University, I had to do a term paper. It took me back into the early newspapers of America. One area was when we were converting from DC electricity to AC. Very informed people, very alarmed people, were saying: If we have AC electricity, we're going to electrocute the world. We're going to turn our stoves into hot plates. It didn't happen, and I know people are concerned. But from my experience out there, DOE and DuPont Company will do everything possible to see that the environment and the public is protected. Thank you, sir.	Comments noted.
James W. Hammond		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

Natural Resources Defense Council, Inc.
1725 I Street, N.W.
Suite 600
Washington, D.C. 20006
202 223-8210

New York Office
122 East 42nd Street
New York, N.Y. 10168
212 949-0049

Western Office
25 Kearny Street
San Francisco, Calif. 94108
415 421-6561

STATEMENT BY DR. THOMAS B. COCHRAN
ON BEHALF OF THE
NATURAL RESOURCES DEFENSE COUNCIL
AT DEPARTMENT OF ENERGY PUBLIC HEARINGS
ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR PROPOSED L-REACTOR OPERATIONS

Beaufort, South Carolina

November 3, 1983

New England Office: 16 Prescott Street . Wellesley Hills, MA.
02181 . 617 237-0472
Public Lands Institute: 1720 Race Street . Denver, CO. 80206
303 377-9740

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>Introduction</u>		
	My name is Dr. Thomas B. Cochran. I am a Senior Staff Scientist at the Natural Resources Defense Council, Inc. (NRDC). NRDC is a public interest environmental protection organization with extensive technical and policy expertise on nuclear matters, representing over 43,000 members and contributors in the United States and abroad.	
	I have been a consultant to numerous government agencies on matters related to nuclear energy, including the Department of Energy's (DOE) Energy Research Advisory Board (ERAB), DOE's Nonproliferation Advisory Panel, and the Energy Research and Development Administration's (ERDA) LMFBR Review Steering Committee. I currently serve on ERAB's Technical Panel on Magnetic Fusion, which was established by the Magnetic Fusion Energy Engineering Act of 1980 (P.L. 96-386). I am also a member of the Three Mile Island (TMI) Public Health Fund Advisory Board, the Nuclear Regulatory Commission's (NRC) TMI Advisory Committee, and the NRC's Special Study of Nuclear Quality Assurance. I am the principal technical expert on behalf of NRDC in the licensing proceedings for the Clinch River Breeder Reactor.	
	I am the author of <u>The Liquid Metal Fast Breeder Reactor: An Environmental and Economic Critique</u> (Johns Hopkins University Press, 1974), co-editor of the <u>Nuclear Weapons Databook</u> series and co-author of Volume I: <u>U.S. Nuclear Forces and Capabilities</u> (Ballinger, 1983, in press).	
	I have a Ph.D. degree in physics, an M.S. degree in physics, and a B.E. degree in electrical engineering from Vanderbilt University. I was a Health Physics Fellow under the Atomic Energy Commission's radiation training program.	
	While there are several important issues related to the proposed start-up of the new L-reactor, my statement will be limited to two issues: First, is the L-reactor safe -- does it meet the minimum safety standards imposed by the NRC on licensed commercial power reactors? Second, can the operation of the L-reactor be delayed long enough to incorporate needed environmental and safety technologies without risk to national security?	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	1. <u>The L-Reactor Safety Issue</u> Turning first to the safety issue, it must be recognized that DOE facilities, such as the new L-reactor, are not licensed by the NRC. It is DOE's policy, however, to conform where appropriate to all NRC environmental and safety regulations, or, at a minimum, to meet the intent of these regulations. In DOE's own words: Although DOE production facilities are not subject to regulation by the Nuclear Regulatory Commission (NRC), DOE and its contractors conform to internally promulgated guides that, where appropriate, parallel or meet the intent of those of the NRC.¹ For reactors licensed by the NRC, the fundamental regulations that determine the adequacy of the site and the design of the containment/confinement system for limiting exposure to the public in the event of a severe accident are embodied in 10 CFR Part 100, Reactor Site Criteria (27 Fed. Reg. 3509 (1962)). These regulations, which were developed prior to the separation of the Atomic Energy Commission (AEC) into ERDA (now DOE) and the NRC, have been used for two decades to judge the adequacy of both NRC and DOE facilities and sites. There is no debate over whether the purpose and intent of these regulations apply to DOE facilities. In fact, DOE and its contractor, DuPont, have used 10 CFR Part 100 on numerous occasions to judge the adequacy of a wide variety of containment/confinement	
	¹E. I. duPont de Nemours & Co., "Safety Analysis of Savannah River Production Reactor Operation," DPSTSA-100-1, Revised Sept. 1983 (hereafter "1983 SAR"), p. 5.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	alternatives for the production reactors at SRP.² Less than three years after 10 CFR Part 100 regulations were promulgated, SRP officials noted with respect to 10 CFR Part 100 dose limits, "These values do not constitute legal limits....It may be expected, however, that dose limits greater than those shown in the regulation will meet with AEC opposition."³	
	²Memorandum from W. S. Durant to E. C. Nelson, "Proposed Containment Shell for Building 105-C," Tech. Div. Savannah River-Laboratory (SRL), DPST-64-423, Jan. 29, 1965. Roger E. Cooper and Bernard C. Rusche, "The SRL Meteorological Program and Off-Site Dose Calculations," SRL, DP-1163, Sept. 1968. Memorandum from S. P. Tinnes to G. F. Merz, "Airborne Activity Confinement System Base Case Design Basis Accident," Tech. Div. SRL, DPST-79-441, July 19, 1979. Memorandum from S. P. Tinnes to G. F. Merz, "Airborne Activity Confinement System Performance First Five Hours After Reactor Accident," Tech. Div. SRL, DPST-79-555, Nov. 1, 1979. Memorandum from S. P. Tinnes to D. A. Ward, "Airborne Activity Confinement System Performance More Than Five Hours After DBA," Tech. Div. SRL, DPST-80-588, Oct. 3, 1980. Memorandum from A. G. Evans, J. B. Price, and S. F. Petry to D. A. Ward, "Proposed Airborne Confinement System," Tech. Div. SRL, DPST-81-596, July 23, 1981. Memorandum from W. L. Pillinger to T. V. Crawford, "Radiiodine Releases from Carbon Filter Desorption for Dose Calculations in Reactor SAR," Tech. Div. SRL, DPST-82-960, Oct. 29, 1982.	
	³Memorandum from W. S. Durant to E. C. Nelson, DPST-64-423, <u>op. cit.</u>, at p. 3.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	In my statement below, I will demonstrate that the L-reactor does not comply with the requirements of 10 CFR Part 100 as interpreted by the NRC in over 20 years of application. I will then explain how DOE in its draft environmental impact statement has attempted to obfuscate the L-reactor's failure to comply with 10 CFR Part 100 requirements.	
	<u>A. Requirements of 10 CFR Part 100</u>	
	The requirements of 10 CFR §100.11 are reproduced in Appendix A to this statement. These guidelines specify reference values for the maximum radiation dose an individual is permitted to receive at the outer boundaries of the plant and the so-called "low population zone." The reference dose values for both boundaries are 25 rem to the whole body and 300 rem to the thyroid. In assessing compliance with 10 CFR Part 100, DOE assumes that the boundaries for the SRP site and the low population zone are identical. Thus, at SRP all doses are computed at the site boundary. The doses are calculated for a 2-hour exposure and for a 120-hour exposure, the latter intended to cover the time period for the entire passage of the "radioactive cloud," as required by the regulation. Since the reactor locations and site boundary are already specified at SRP and thus cannot be altered, this dose assessment is used to test whether the containment/confinement technology at the production reactor is adequate, or whether it must be upgraded to meet minimum safety requirements.	
	<u>B. Computation of the Maximum Site Boundary Doses</u>	
	There are three procedures necessary to evaluate compliance with 10 CFR Part 100 requirements. First, the source and amount of radioactivity released to the containment by a particularly severe accident (referred to as the "source term") must be specified. Second, the atmospheric dispersion of radioisotopes, as they are carried by the wind to the site boundary, must be computed. Third, the amount of radiation absorbed by an individual at the site boundary must be computed. In each case, the methodology has been established by two decades of reactor licensing experience and regulatory guidance.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BL-1	The 10 CFR Part 100 source term for light water reactors (LWRs) assumes a full core meltdown with the release to the containment building of 100% of the noble gases, 50% of the iodine (half of which is assumed to plate out within a short time), and 1% of the remaining fission products (specified in the NRC guidance document, TID 14844). We will concentrate on the noble gases and iodine since these are the most troublesome in terms of the existing L-reactor confinement technology.	The regulations in 10 CFR 100 do not assume or require the assumption of "a full-core meltdown." Rather, the footnote to 10 CFR 100.11(a) clearly indicates "accidental events, that would result in potential hazards not exceeded by those from any accident considered credible. Such accidents have generally been assumed to result in substantial meltdown of the core with subsequent release of appreciable quantities of fission products" (emphasis added). "Full-core meltdown" is not equal to "substantial meltdown"; the 10 CFR 100 reference to TID-14844 particularly notes that: "The calculations described (in TID-14844) may be used as a point of departure for consideration of particular site requirements which may result from <u>evaluation of the characteristics of a particular reactor, its purpose and method of operation</u> (emphasis added). Thus, the source-term assumption cited is not mandated for use, either in 10 CFR 100 or in TID-14844. The NRC licensing of the Fort St. Vrain reactor is an example of a reactor licensed with recognition of the differences between its design and the design of light-water reactors (LWRs). This reactor does not have a containment dome, but has alternative safety features that the NRC considers to be adequate. Recognizing the high heat capacity of this graphite-moderated reactor, no fuel melting was assumed when specifying the source term for use with 10 CFR 100. Release of gases as a result of core heatup (not melting) was assumed over a period of hours, not instantaneously as is commonly assumed for LWRs. Furthermore, release of only 5.5 percent of the halogens in the reactor core was assumed, rather than the 50 percent commonly assumed for LWRs.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BL-2	An immediate question is raised: Is this LWR source term appropriate for the SRP production reactors given their differences in design? The answer is yes. As noted above, DOE has adopted the identical source term for judging the adequacy of the confinement system for existing SRP production reactors.⁴ As shown below, however, DOE has responded to recent controversy by attempting to change this source term for the L-reactor, with only the thinnest of justifications. The second step in the calculation--atmospheric dispersion--is calculated according to NRC Regulatory Guidelines. Since the maximum individual dose calculation is intended to be conservative, the specified meteorology has a low probability of occurrence. At SRP, less favorable meteorology and higher doses are expected only 0.5% of the time.⁵	Although early safety systems analyses did adopt a 100-percent core-melt accident as a basis for assessing SRP reactor confinement systems to assure a conservative upper bound during development of a comprehensive accident analysis program, DOE has never adopted a 100-percent core-melt source term as a requirement for assessing the adequacy of SRP production reactor confinement systems in terms of 10 CFR 100. Furthermore, if subject to NRC licensing requirements, DOE would not necessarily be required to do so (see the response to BL-1). The 1983 Safety Analysis Report (DPSTSA-100-1) compares the consequences of four types of accidents that bound the consequences of credible accidents to 10 CFR 100 reference doses assuming meteorological 95 percent conditions, consistent with those typically used to assess conformance to 10 CFR 100. Of the four accidents, the one yielding the maximum consequences (the accident resulting from a reloading error) is the appropriate accident for comparison with 10 CFR 100 criteria.
	⁴See references cited at page 3. For licensing the Clinch River Breeder Reactor, DOE and NRC have adopted the usual LWR source term (100% of the noble gases, 50% of the halogens, and 1% of the fission products) plus 1% of the plutonium in the core (NRC, "Site Suitability Report in the Matter of Clinch River Breeder Reactor Plant," NUREG-0786, June 1982, p. 111-8). Even for this radically different reactor design, the assumed noble gas and iodine source terms are identical to those for the LWR and the production reactors at SRP.	Previous SARs and other studies, including the cited references, reviewed a spectrum of accidents ranging from the credible to the not credible, including a 100-percent core melt, in assessing the safety of SRP reactor operations. This same approach, including consideration of an 11-percent core melt and a 100-percent core melt was used in the preparation of the 1983 SAR to present again the totality of risks, not just the risk of accidents prescribed by regulations applicable to commercial reactors. Although the types and severity of accidents considered did not change, the method of presenting the results was changed to improve clarity and readability of the report and to put the results in perspective relative to risk.
	⁵According to the 1983 SAR, "Doses are computed by two methods. The first method computes, for the entire site (all 16 sectors), a dose (either inhalation or whole body) that would be exceeded only 5% of the time. The result is referred to as the 95th percentile value. The second method computes for each sector a dose value that would be exceeded only 0.5% of the time (a 99.5th percentile procedure). The maximum dose for all sectors is then compared to the 95th percentile dose for the whole site, and the higher of the two values is reported.	
	For the SRP site, the second method (99.5th percentile worst sector) gives doses (both thyroid and whole body) at the site boundary that are about a factor of two higher than the value obtained with the first method (95th percentile whole site)." Id. at p. 15-74.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BL-3	Using data presented in the 1983 SRP Production Reactor Safety Analysis Report (1983 SAR), one can compute the maximum individual whole body and thyroid doses at the L-reactor site boundary to test compliance with 10 CFR Part 100. Table 15-4 of the 1983 SAR, reproduced in Appendix B to this statement, reports the whole body and thyroid doses associated with 1% and 3% core damage at the L-reactor. These doses are based on the assumption that 1% core damage would result in airborne release of 1% of the noble gases and tritium and 0.5% of the iodine (1983 SAR, p. 15-69). This source term value for 1% core damage need only be scaled up to 100%, or full core damage, to be consistent with the appropriate 10 CFR Part 100 source term--release of 100% of the noble gases and 50% of the iodine. The resulting doses for the new L-reactor would be:	Consistency with 10 CFR 100 does not require consideration of the release of 100 percent of the noble gases and 50 percent of the iodine. See the responses to comments BL-1 and BL-2.

<u>Accident</u>	<u>Meteorology</u>	<u>Calculated Dose(rem)</u>	
		<u>Whole Body</u> <u>2-hour</u>	<u>Thyroid</u> <u>120-hour</u>
10 CFR Part 100 source term (100% noble gas & 50% iodine release from fuel)	99.5th percentile	220	1050
10 CFR Part 100 Reference Values		25	300

As can be seen, the new L-reactor does not meet minimum safety requirements for the control of radioactivity releases in the event of a severe accident. If Congress said tomorrow, "This reactor must be licensed by the NRC," DOE would have no choice but to improve the confinement system in order to trap about 90% of the noble gases released from the reactor core after a severe accident.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	<u>C. DOE's Efforts to Mask L-Reactor Non-Compliance With 10 CFR Part 100</u>	
BL-4	In response to extensive public criticism questioning the L-reactor's safety and its lack of a containment building, DOE has developed the following argument to deflect attention from the L-reactor's failure to meet 10 CFR Part 100 requirements. DOE now claims that there are no credible L-reactor accidents that could result in fuel melting of more than 3% of the reactor core and, consequently, that one should assume a design basis accident⁶ and a source term which are 30 times smaller than DOE and NRC previously assumed. Based on these assumptions, DOE argues, the offsite doses associated with all credible L-reactor accidents are well within 10 CFR Part 100 guideline values. This argument simply cannot withstand scrutiny.	See the response to comment BL-2. The 3-percent core-melt accident was selected for comparison to 10 CFR 100 dose criteria because it is a major accident, postulated from the consideration of possible accident events, that would result in potential hazards not exceeded by those from any accident considered credible. Clearly, the 1-percent design limit for the Emergency Cooling System (ECS) could not be considered limiting for site evaluation because it is not the maximum credible accident. It is incorrectly inferred here and throughout this statement that the ECS is designed to limit core damage to 1 percent in the event of the maximum credible LOCA. For all credible LOCAs, no fuel melting is anticipated (see SAR, page 15-44). The 1-percent design basis referred to is, in fact, a limit applied to the reactor power level to limit core damage to 1 percent in the event of a hypothetical maximum-rate leak (an accident that is not considered credible, as discussed below) accompanied by two other circumstances that render two of the three emergency coolant injection systems ineffective. The hypothetical maximum rate leak is assumed to result from an abrupt, double-ended break of a large pipe. Such a break is not considered credible because stainless-steel pipe in the low-temperature, low-pressure, low-corrosion conditions of SRP reactors would not undergo abrupt catastrophic failure. The two conditions assumed to render two-thirds of the emergency coolant injection system ineffective contend that the break occurs in one of the injection lines and that some unspecified failure of an active component disables one of the two remaining injection lines.
	⁶The term "design basis" is used in the context of nuclear licensing to denote the range of postulated accidents for which it is required to provide protection in the form of engineered safety features systems. For purposes of 10 CFR Part 100, the NRC equates "design basis accidents" with "credible accidents." The 10 CFR Part 100 source term must be greater than that resulting from any "credible" or "design basis" accident.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	DOE apparently bases this argument on the fact that the SRP emergency core cooling systems (ECCS) are currently designed to limit core melting to no greater than 1% of the fuel. ⁷ DOE also points to its estimates that a fuel reloading accident at SRP would result in no greater than 3% core melting (1983 SAR, p. 15-69). DOE's claims that this 1-3% fuel melting figure should be plugged into the 10 CFR Part 100 source term analysis files in the face of both DOE's own analysis of existing SRP reactors and NRC's treatment of licensed commercial reactors.	
BL-5	To begin with, neither DOE nor NRC has ever used ECCS design criteria as a basis for judging the adequacy of the confinement system under 10 CFR Part 100. For light water power reactors, and historically for the DOE production reactors, NRC and DOE have assumed a full-core meltdown and the traditional 10 CFR Part 100 source term as the design basis accident for the confinement system. The 10 CFR Part 100 requirements were intended to provide a substantial additional layer of conservatism above and beyond that provided by emergency core cooling and other safety features designed to mitigate against design basis accidents. In other words, when 10 CFR Part 100 was developed, the AEC decided that, even if the plant were designed to prevent and mitigate against all credible accidents, the possibility for a much more serious, though highly	The ECS performance has no direct bearing on the "adequacy of the confinement system" as evaluated, because the accident causing the greatest core damage is not a loss-of-coolant accident (LOCA); it is, rather, a fuel melt resulting from a reloading criticality accident that is not mitigated in any way by ECS performance. The fact that the most severe credible accident at the L-Reactor is a criticality accident (rather than a LOCA for a power reactor) reemphasizes the need to consider "the characteristics of a particular reactor" (10 CFR 100, note) in arriving at appropriate source terms.
	⁷DOE has postulated two classes of DBAs for which the SRP ECCS should be capable of providing protection: loss-of-coolant and loss-of-circulation (J. W. Joseph, Jr., and R. C. Thornberry, "Analysis of the Savannah River Reactor Emergency Core Cooling System," SRL, DPST-70-463, Oct. 1970, p. 13). In 1970, DuPont estimated that the maximum amount of core melting for which the ECCS could be maintained was 10%. <i>Id.</i> at p. 17. Today, SRP establishes operating power limits designed to limit core damage from loss-of-coolant and loss-of-circulation accidents to less than 1%. 1983 SAR, pp. 15-51, 15-54.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	improbable, accident could never be completely discounted, and therefore its consequences must be considered when siting the plant and designing the containment system.⁸ As implemented, the 10 CFR Part 100 regulations state that the major accident from which the source term should be calculated has "generally been assumed to result in <u>substantial meltdown of the core with subsequent release of appreciable quantities of fission products.</u>" (10 CFR §100.11(a), n. 1.1)⁹ Thus, the history of 10 CFR part 100 convincingly demonstrates that the regulation should not be based on ECCS design criteria.	
BL-6	Secondly, DOE's argument, if carried to its logical conclusion and applied to NRC-licensed reactors, would result in a complete anomaly. DOE claims that, since SRP reactor ECCSs are designed to limit fuel melting to 1%, the 10 CFR Part 100 doses should be calculated, and the adequacy of the containment tested, based on the 1% figure. Yet, reactor ECCSs licensed by the NRC are designed to permit no fuel melting whatsoever.¹⁰ According to DOE's logic, NRC-licensed reactors would not even need containment buildings, since there would be no 10 CFR Part 100 offsite doses at all based on the ECCS no-fuel-melting criteria. This absurd result underscores the weakness of DOE's argument and demonstrates the need to assure sufficient conservation by basing 10 CFR Part 100 upon a substantial meltdown accident, rather than on ECCS design criteria.	As indicated in Table 4-22 of the Draft EIS, the limiting accident is derived from a reloading criticality, not a LOCA; therefore, it is unaffected by ECS performance. Section 4.2.1.5 and Table 4-24 of the draft EIS further assess the effectiveness of the confinement system for a postulated 10-percent core melt based on the NRC CRAC2 methodology. Also see the response to comment BL-4 concerning the design of the SRP ECS.
	⁸Atomic Energy Commission Reactor Site Criteria, Report to the Director of Regulation by the Director, Licensing and Regulation, AEC-R 2/39, Appendix D at p. 9.	
BL-7	⁹As noted previously, the precedent with regard to both commercial power reactors and production reactors has been to interpret "substantial meltdown with subsequent release of appreciable quantities of fission products" to mean full core meltdown with the instantaneous release to the containment or confinement system of 100% of the noble gases, 50% of the iodine, and 1% of the remaining fission products.	See the responses to comments BL-1 and BL-2.
BL-8	¹⁰The NRC assumes as a design basis accident a loss-of-coolant accident caused by a double-ended pipe break. Reactors must be designed to permit no fuel melting from this accident, even assuming the single failure criterion.	See the response to comment BL-4.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BL-9	Furthermore, even if DOE were somehow correct in basing the 10 CFR Part 100 analysis upon the ECCS design criterion, the 1-3% fuel melt figure is still far too low to be considered the maximum credible accident. The ECCS design criterion of not more than 1% fuel melting is based on the single failure criterion, which assumes that an accident--<u>e.g.</u>, a pipe break--is accompanied by the most detrimental failure of a single active component of the system. Common cause failures, which could cause simultaneous failure of two or more active components, could cause fuel melting beyond that established as the ECCS DBA. For example, the accident at Three Mile Island Unit 2 was "beyond the design basis of the ECCS" in that there were multiple failures of active components, resulting in cladding, and possible fuel melting well beyond the ECCS design limits.	See the response to comment BL-4 concerning definition of ECS design criterion. Since the startup of SRP reactors, a continuing effort has been devoted to review of the effectiveness of the reactor safety systems and the upgrading of the systems. These reviews have included analysis of what has come to be known as "common cause" failure modes. Where credible failure modes of this nature have been identified and considered to be of importance, design or operational changes have been implemented to cope with the failure modes. Several examples of the design changes implemented to cope with common cause failures of the ECS are described in Appendix J of the EIS (see the discussion of submersible addition valves, page J-9, isolation valves, page J-11, new sump pumps, page J-11, 36-inch-high dams, page J-12, and automatic incident action sensors, page J-12). The ECS header represented a unique failure point in that a massive leak from the header could flood the reactor basement, possibly causing a "loss of pumping" accident while at the same time possibly rendering the ECS incapable of coping with the accident. To overcome this deficiency, a series of isolation valves were installed in the mid-1970s. The risk analyses discussed in the EIS and 1983 SAR include estimates of recognized credible common cause failures, but do not make an arbitrary allowance for nonspecific common cause failures.
BL-10	The Three Mile Island accident points up another flaw in the DOE analysis of "credible" accidents at SRP. DOE assumes that the percent release of noble gases is directly proportional to the percentage of fuel melted, <u>e.g.</u>, 3% fuel melting results in the release of 3% of the noble gases. To the contrary, at TMI Unit 2, the percentage of the noble gas inventory released was several times the percentage of the core damaged.	The assertion that "at TMI Unit 2, the percentage of the noble gas inventory released was several times the percentage of the core damaged" is without foundation. Most recent estimates of TMI-2 core condition suggest that a very large portion is damaged. It is significant to note that despite the large core damage, quantities of radioiodine released from the coolant system were minute compared to the full-core-melt estimate.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BL-11	In any case, the question of whether fuel melting beyond 3% is "credible" or "incredible," from the standpoint of the ECCS criteria, is irrelevant from the standpoint of the confinement system design requirements. The confinement system must meet 10 CFR Part 100 requirements. It must maintain off-site doses below 10 CFR Part 100 guideline values, assuming the release of 100% of the noble gases, if it is to achieve its "defense-in-depth" objective of limiting the risk to the public if a more serious accident, not normally considered credible, should occur. As shown above, the L-reactor simply does not meet these requirements.	The confinement system for L-Reactor would meet the dose criteria of 10 CFR 100, were they to apply (see draft EIS Tables 4-22 and 4-24; also see the response to comment BL-1).
BL-12	As a separate matter, DOE has attempted to use probabilistic risk analyses to bolster its argument that accidents resulting in more than 1-3% fuel melting are not "credible." In essence, DOE claims that more severe accidents are not credible since the probability of their occurrence is less than one in a million (10^6) per reactor year of operation. The calculations cited in the DEIS (Vol. 1, p. 4-54; Vol. II, pp. G-44 to G-48) refer to estimates made in a recent internal DuPont memorandum (J. P. Church to D. A. Ward, "Risk Estimates for SRP Production Reactor Operation," DPST-83-717, Aug. 26, 1983). This internal document, however, points out that the risk assessment will not be completed for about two years and that	Four accidents which bound the consequences of credible accidents are reviewed and discussed in the EIS and the 1983 SAR. The bounding accidents were selected by following the traditional approach to reactor safety analysis by analyzing the consequences of "worst case credible" and even some "noncredible" accidents based on the single failure criteria. Both mechanistic and probabilistic arguments were used to define the "worst case credible" accidents. Best estimates of the probability of occurrence of these accidents are presented in the EIS in order to define as accurately as possible not only the consequences of these accidents but also the associated risk (consequence multiplied by probability of occurrence) of these accidents.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	The present study should be viewed as a preliminary estimate of risk. <u>The study is not sufficient for use as a basis for making absolute decisions about improving reactor safety.</u> It is intended as a guide to engineering judgement in establishing priorities for the use of resources in making further improvements in reactor safety, just as the previously estimated risks and probabilities have been used in the past. Even the complete PRA will have limitations and will be used in much the same way. PRA results are inherently subject to uncertainty. In particular, PRA results cannot be expected to quantify risks from accidents or events which cannot or have not been postulated and quantified.	As noted in the second quote, the probabilities are the best estimates that can be made at the present time with existing data and resources; and they are judged to be reasonable. The primary deficiency alluded to in the first quote is not with the probabilities but with the fact that some less probable accident scenarios are not yet included as noted in the remainder of the caveat, which was not quoted but is reproduced below:
	<u>Id.</u>, pp. 2-3 (emphasis added).	".... They do not include the probability of initiating events which could result in common failures of several safety systems, and which can be postulated, but for which there is no experience based upon which to estimate probabilities. For example, a very large earthquake, well beyond the design basis earthquake for the reactor, might render inoperative several or all of the heat removal systems. The frequency of occurrence of such an earthquake is not known--it might truly be zero; it is certainly less than once in 10,000 years. However, when the results of probability calculations yield values as low as 10^{-7} (as in this study) per year, it is appropriate to recognize that there may very well be exceedingly rare events whose risk contributions have been quantified. The important conclusion is that an event so rare as to occur only once in 10^7 years, as in cases discussed above, should be regarded as having, in effect, zero probability. There is no incentive to further reduce its probability or its consequence. An event having a probability of once in 10^4 years might be considered as a significant contributor to risk if the consequence of the event is known or judged to be very large. Thus there is incentive to reduce its probability or consequence."
	In the DEIS, the DOE conveniently fails to mention this cautionary note,¹¹ and also fails to mention the caveats at the end of the DuPont document, including the following:	NRC's conclusion concerning risk analysis of sequences initiated by natural phenomena or deliberate acts of sabotage is pertinent and stated below:
	The estimates of probabilities used in this study for specific accident sequences and consequences should be considered with	"Sequences initiated by natural phenomena such as tornadoes or seismic events and those that could be initiated by deliberate acts of sabotage are in a
	¹¹In the Appendix of the DEIS, DOE indicates that the analysis is "preliminary" (DEIS, Vol. II, p. G-48). In the main text (DEIS, Vol. I, pp. 4-54 to 4-55), the results are presented without caveats and are presented as "fact."	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	careful regard to the assumptions made. First, the estimates of component and system failure rates or failure probabilities used in this study were not obtained by a comprehensive analysis. They are the best estimates that can be made at the present time with existing data and resources. They are judged to be reasonable. Second, the estimated rates are based upon extrapolations of experience. <u>They do not include the probability of initiating events which could result in common failures of several safety systems, and which can be postulated, but for which there is no experience base upon which to estimate probabilities.</u> Id., p. 16 (emphasis added). Indeed, the failure to take into account common cause failures results in estimates of fuel melting that are likely to be several orders of magnitude too low. This renders the overall absolute probabilities meaningless for judging whether the probability of accidents resulting in more than 3% fuel melting is 10^{-6} per reactor year, as DOE would have us believe, or closer to 10^{-4} per year, or even higher. DOE has used the same probability analysis as a partial basis for its contention that alternative containment/confinement options are not cost effective (DEIS, Vol. 1, Table 4-31, fn. d, p. 4-80). The absolute probabilities are similarly an insufficient basis for this contention.	large measure taken into account in the design bases and operation. The data base for assessing the probability of events more severe than the design bases for natural phenomena is extremely small. Therefore, accident sequences initiated by such events is considered beyond the state-of-the-art of probabilistic risk assessment." (Reference: Final Environmental Statement on the operation of Bryon Station, Units 1 and 2, NUREG-0848, U.S. Nuclear Regulatory Commission, April 1982.) Of all the types of accidents considered in the preliminary PRA, the LOCA accident and the associated response of the ECS are the most thoroughly studied. Rather comprehensive analysis including common cause failures has been applied to this accident as evidenced by the number of design changes implemented to address common cause failures (see the response to comment BL-9).
BL-13	The DOE comparisons of the cost effectiveness of alternative containment/confinement options (DEIS, Vol. 1, Table 4-31) contain even more fundamental errors that render them useless. It is perhaps useful to mention several of these errors, although I do not intend to discuss them in detail in this statement. (1) It is inappropriate to include a production loss of \$150,000 per reactor-day without including offsetting operating costs that would not be incurred.	With respect to the comments on the cost-effectiveness evaluation of alternative safety systems: 1. The value of \$150,000 takes into account reduced operating costs.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	(2) The estimated man-rem's averted do not include exposures: (a) to persons exposed on site, (b) to persons exposed at a distance greater than 80 km, (c) to organs other than whole body, e.g., thyroid, and bone, (d) associated with fuel-melting beyond 10% of the core. Recognizing these inherent deficiencies, the NRC has decided that this cost-benefit approach should under no circumstances be used as a substitute for existing regulatory requirements. These requirements include ensuring compliance with 10 CFR Part 100, performing adequate site selection, and ensuring that the containment/confinement system is adequate for the protection of public health.	2(a). The estimated person-rem do not consider onsite exposures with any alternative because there is no basis for assuming any difference in onsite exposures to plant workers subject to emergency procedures in the event of an accident. 2(b). As noted in Table 4-24 of the Draft EIS, person-rem exposures at distances as far as 800 kilometers are only about twice those out to 80 kilometers for each alternative and do not alter the cost benefit by more than a factor of two. 2(c). Table 4-24 of the Draft EIS also lists the population thyroid doses for both 80- and 800-kilometer radius zones. Inclusion of these doses would not significantly alter the cost-benefit values, particularly those based on the EPA value per health-effects averted, because thyroid damage is extremely unlikely. 2(d). Values for any desired core-melt hypothesis can be determined by inverse scaling of the cited cost-benefit values with the core-melt percentage.
BL-14	In sum, the L-reactor, as presently designed, is simply unsafe. It does not meet the minimum standards for design of a containment/confinement system to protect the public health in the event of a severe accident. Following the recent controversy over the adequacy of the L-reactor confinement system, DOE has attempted to lower its safety requirements--reducing the requirements for confining noble gases by a factor of 30--rather than improve the confinement technology. Simply stated, DOE believes its reactors should be held to the nuclear regulatory requirements of the Truman and Eisenhower administrations rather than today's standards. We disagree. <u>11. The National Security Issue</u> I will now turn to the national security issue. Here, the central question is whether DOE can safely defer the restart of the L-Reactor in order to incorporate the technologies needed	The L-Reactor is not unsafe and does meet the minimum standards for design of a containment/confinement system (see the response to comment BL-11). Rather than lower its safety requirements (see the response to comment BL-2), DOE has continued to upgrade reactor safety systems and explore new methods to further protect the public health and safety.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	to meet today's minimal environmental and safety standards. Can we have both a safe and clean environment and adequate national security, or must the former be sacrificed for the latter, as DOE would have us believe?	
BL-15	In the DEIS (Vol. 1, Chapter 1), DOE's emphasis on the "need" issue has been in terms of whether the L-reactor should be restarted at all, rather than the less demanding question of whether restart of the L-reactor can be deferred. A 36-month delay in L-reactor operations is ample time to upgrade the environmental control and safety systems. This period would permit installation of four of the five confinement/containment alternatives (DEIS, Vol. 1, p. 4-80), and would also permit the installation of mechanical draft cooling towers (DEIS, Vol. 1, p. 4-95). The cost of a 36-month delay in terms of foregone plutonium production is approximately 1.5-1.75 MT of plutonium. Thus, the central question here is whether 1.5-1.75 MT of foregone plutonium production is a threat to national security, or, alternatively, whether this amount (or some fraction thereof) can be supplied by other production initiatives without incurring a shortage of plutonium "needed" for nuclear weapons production.	The effects on meeting established needs for defense nuclear materials with a delay of the L-Reactor restart is analyzed in Appendix A (classified). Implementation of the potential combination of partial-production options providing the greatest material production (the accelerated use of the Mark-15 lattice at SRP reactors and the production of less than 6 percent plutonium at the N-Reactor) to compensate for production losses commensurate with these delays in the L-Reactor restart provide only a small fraction of needed defense materials that could be produced by L-Reactor. This is summarized in Section 2.1.3 in the EIS.
BL-16	To place this issue in perspective, it should be noted that the U.S. nuclear weapons stockpile currently contains some 80 to 90 metric tons of plutonium and 600 to 700 metric tons of highly enriched uranium. It is incredible to think that a 2 percent change in the plutonium inventory would be detrimental to national security. Certainly, we cannot estimate the number of Soviet warheads or weapons material production to that level of accuracy. Setting this argument aside, there is strong evidence that restart of the L-reactor can be delayed for at least 36 months without incurring a shortage in plutonium to meet DOE projected weapon requirements.	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	<u>A. Would a Near-Term Shortage of Plutonium Be Incurred By a Delay In Start-up of the L-reactor?</u>	
BL-17	First, the DEIS fails significantly to give special consideration to a short-term delay in L-reactor operation and the shortages of materials, if any, that this delay would incur, even without alternative production options. The relevant questions that must be asked are: Would a near-term shortage occur, and, if so, could the alternative production options eliminate it?	See the response to comment BL-15.
BL-18	When the 1981-83 Nuclear Weapons Stockpile Memorandum (NWSM) was signed by President Carter in October 1980, DOE projected that, unless the new production initiatives were implemented, there would be a shortage of plutonium in 1985 or shortly thereafter. With the implementation of several planned initiatives, including the restart of the L-reactor (DEIS, p. 1-3), a plutonium shortage was not projected to occur prior to the early 1990s. DOE indicates that "the increased defense nuclear material requirements . . . have been reaffirmed in subsequent Stockpile Memoranda" (DEIS, p. 1-2), but that "Congress has delayed or failed to fund certain nuclear weapons systems" (DEIS, p. 1-2). The effect has been to eliminate the shortage previously projected to occur in the early 1990s. In my view, foregoing plutonium production in the L-reactor for 36 months, <u>even if none were made up through alternative near-term production initiatives, would not create near-term shortages.</u> In the long term (after 1990), shortages that might otherwise appear can be made up by a variety of production initiatives, several of which are identified below. DOE apparently does not dispute this view. Rather, DOE simply asserts that "none of the [alternative] production options, or combinations of options, would provide sufficient material in time to fully compensate for the delay or loss of L-Reactor production" (DEIS, p. 1-6). But this is not the relevant question. As stated above, the questions are: Would a near-term shortage occur, and, if so, could the alternative production options eliminate it?	The quantitative analysis of nuclear material requirements and supply provided in Appendix A (classified) demonstrates the need for the restart of L-Reactor as soon as practicable to meet the requirements identified in the FY 1984-1989 Nuclear Weapons Stockpile Memorandum. See also the response to comment BL-15.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	<u>B. The Recent Delays In Weapons Systems Have Significantly Reduced the Near-Term Requirements for Plutonium.</u>	
BL-19	This can be seen by comparing the weapons requirements set forth in the Carter FY 1981-83 NWSM against today's requirements. The FY 1981-83 NWSM, signed in October 1980, included a significant increase in warhead production and was the impetus for materials production initiatives. Included in this NWSM were: - the first firm requirements for 700 W84 and W85 warheads for Pershing II and Ground-Launched Cruise Missiles, - some 2000 MX missiles warheads planned for a 200-missile force, - sufficient W76 Trident I warheads (5,520) for backfit into 12 Poseidon submarines and 15 new Trident submarines, - 1200 W-70-3 Lance and W79 8-inch nuclear artillery warheads built as fission warheads with the technical ability to be shifted to enhanced radiation yields, - 460 W80-0 Sea-Launched Cruise Missile warheads, - 3,394 W80-1 Air-Launched Cruise Missile warheads, and - 1000 W-82 155-mm fission artillery warheads. The FY 1983-88 NWSM signed by President Reagan in November 1982 made significant changes to its early assumptions, which were similar to the Carter Administration:¹²	See the response to comment BL-16. As indicated in Section 1.1.1 and Appendix A (classified), the defense nuclear material requirements of the FY 1984-1989 Nuclear Weapons Stockpile Memorandum support the need to restart L-Reactor as soon as practicable. The availability of all recoverable material from retired weapons is included in the determination of material supply for new weapons in the NWSM. DOE utilizes this material in meeting new defense nuclear material requirements. Section 1.1 contains added information on this subject in this final EIS.
	¹²Nine warhead types continue in production during 1983: - the B61-3/4 bomb, - the W76 Trident I warhead, - the W79 enhanced radiation artillery warhead, - the W80-0-0 Sea-Launched Cruise Missile warhead, - the W80-1 Air-Launched Cruise Missile warhead, - the B83 Modern Strategic Bomb, - the W84 Ground-Launched Cruise Missile warhead, - the W85 Pershing II warhead, and - the W87 MX warhead.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	- only 1000 MX warheads would be built for 100 MX missiles, - W76 Trident I warhead production would be cut to 3840 in the short term, with a shift to Trident II production in time for fitting the ninth Trident submarine (1989), - the W70-3 Lance and W79 8-inch nuclear artillery warheads would be built as enhanced radiation warheads, - 758 rather than 460 W70-0 Sea-Launched Cruise Missile warheads, - a significant reduction in near-term W80-1 ALCM production from 3,394 to 1,739 with shift to the Advanced Cruise Missile, and - a shift from fission to enhanced radiation yield for 1000 W82 155-mm warheads.	
	Significant reductions in nuclear material requirements have resulted from Reagan's decision to shift the MX warhead from the W78 design to the W87. In addition, DOE has considerable flexibility in the rate of retirement of old warheads.¹³ This is the primary source of material for new weapons production. The 1983-88 NWSM also included a number of new retirement initiatives, including retirement of B-52Ds and accelerated retirement of B52Gs (with the reduction in bomb needs), retirement of the Titan II, and accelerated retirement of Polaris. The retirements traditionally account for a large proportion of nuclear materials for new warheads. By the end of the decade, some nine warhead types (W25, B28, W31 Nike Hercules, W33, V43, W50, B53, and W76) will be retired either in part or in full.	
	¹³Two significant restraints exist in retiring warheads when scheduled: warhead retirements contingent on replacements (particularly when lack of Congressional funding slows down replacements) and double sets of warheads necessary when enhanced radiation replacements for fission warheads (W70-3, W79, and W82) are kept in the U.S. and a full set of overseas deployed warheads are also kept.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	<u>C. Alternative Plutonium Production Initiatives Are Available to Make Up for a Potential Loss of Some 1.5-1.75 MT of Plutonium Within the Three-Year Period the L-Reactor Is Deferred.</u>	
BL-20	Since 1981, DOE has exceeded its plutonium equivalent production goal. Consequently, part of the 1.5-1.75 MT Pu alternative production requirement has already been met. We estimate that DOE has surpassed its planned production goal at Savannah River by about 0.5 MT in FY 1982-83. At Hanford, the conversion of the N-reactor to the weapon-grade mode of operation was completed in FY 1982, approximately five months ahead of schedule, providing some 0.23 MT of additional plutonium. Thus, the makeup needed from alternative sources is only on the order of 0.8-1.0 MT.	The availability of nuclear material defined in the Nuclear Weapons Stockpile Memorandum includes actual material produced in DOE facilities rather than past production goals and schedules.
BL-21	<u>D. Other Alternatives to L-Reactor Operation</u>	
	(1) <u>Mark-15 Cores.</u> The use of Mark-15 cores could boost plutonium production by at least 25% per reactor. If such cores are installed in two operating SRP reactors, weapon-grade plutonium production (with blending) could be increased by 0.375-0.475 MT per year. Plans exist to install Mark-15 cores in one reactor in late FY 1985 or as late as August 1986. Accelerating introduction of the Mark-15 cores by one year could provide approximately one-half of the plutonium makeup required.	The acceleration of Mark-15 lattice cores and production of 5-percent plutonium-240 at the N-Reactor were considered in the EIS (Sections 2.1.2.2, 2.1.2.3, 2.1.2.4, and 2.1.3). The additional plutonium that would be generated by these partial production options is small compared to the amount needed to offset a delay in L-Reactor restart. The early restart of the PUREX facility will have little effect on the supply of weapons-grade plutonium in the near term because sufficient supplies of fuel-grade plutonium are directly available for blending; the capacity of the facility is large in relation to the backlog of N-Reactor weapons-grade material available for processing. Furthermore, the early plant startup was factored into the material supply information in the FY 1984-1989 NWSM recently approved by President Reagan and used as a basis for the need for L-Reactor in this final EIS. Additional information on implemented initiatives and production options has been included in Sections 1.1 and 2.1 of this final EIS.
	(2) <u>Production of 5% Pu-240 Plutonium at the N-reactor.</u> The shift from 6% to 5% Pu-240 production would produce greater quantities of plutonium than a 10% increase in N-reactor power (DEIS, pp. 2-5, 6). Such a shift could therefore increase plutonium production through blending by about 90 kg/yr, or some 0.27 MT over the next three years.	
	(3) <u>Restart of the Purex Reprocessing Plant at Hanford.</u> DOE now plans to restart the Purex Reprocessing Plant at Hanford in April 1984 to process stored and new N-reactor spent fuel to recover both fuel-grade and weapon-grade plutonium. Restart of the Purex plant three months earlier would provide an additional 100 kg of plutonium per month, or 0.3 MT total.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>E. Summary: Production Options and Proposed Action</u>		
BL-22	We take issue with the DEIS claim that no combination of production options can fully compensate for the loss of material that would be produced by the L-reactor if restart is delayed (DEIS, p. 2-1). As noted above, DOE has given short shrift to its discussion of the combination of production options by failing to examine quantitatively the effect of a 36-month restart delay. The combination of the following alternatives can make up the 1.5-1.75 MT Pu-equivalent loss prior to a shortage developing in the Pu stockpile: (a) Excess Pu already obtained by exceeding previously planned production goals. (b) Operating N-reactor to produce 5% Pu-240 product. (c) Accelerating Purex by 3 months. (d) Accelerating Mark-15 core by 1 year. This combination of alternatives would permit much needed improvements in L-reactor environmental control technology while still meeting defense nuclear material needs. This concludes my statement. NRDC will be submitting to DOE more extensive comments on the L-reactor DEIS prior to the close of the comment period in two weeks. Thank you.	See the responses to comments BL-15, and BL-19 through BL-21.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

APPENDIX A

Requirements of 10 CFR §100.11

10 CFR §100.11 states, in relevant part:

(a) As an aid in evaluating a proposed site, an applicant should assume a fission product release¹ from the core, the expected demonstrable leak rate from the containment and the meteorological conditions pertinent to his site to derive an exclusion area, a low population zone and population center distance. For the purpose of this analysis, which shall set forth the basis for the numerical values used, the applicant should determine the following:

(1) An exclusion area of such size that an individual located at any point on its boundary for two hours immediately following onset of the postulated fission product release would not receive a total radiation dose to the whole body in excess of

¹The fission product release assumed for these calculations should be based upon a major accident, hypothesized for purposes of site analysis or postulated from considerations of possible accidental events, that would result in potential hazards not exceeded by those from any accident considered credible. Such accidents have generally been assumed to result in substantial meltdown of the core with subsequent release of appreciable quantities of fission products.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

25 rem² or a total radiation dose in excess of 300 rem² to the thyroid from iodine exposure.

(2) A low population zone of such size that an individual located at any point on its outer boundary who is exposed to the radioactive cloud resulting from the postulated fission product release (during the entire period of its passage) would not receive a total radiation dose to the whole body in excess of 25 rem or a total radiation dose in excess of 300 rem to the thyroid from iodine exposure.

²The whole body dose of 25 rem referred to above corresponds numerically to the once in a lifetime accidental or emergency dose for radiation workers which, according to NCRP recommendations may be disregarded in the determination of their radiation exposure status (see NBS Handbook 69 dated June 5, 1959). However, neither its use nor that of the 300 rem value for thyroid exposure as set forth in these site criteria guides are intended to imply that these numbers constitute acceptable limits for emergency doses to the public under accident conditions. Rather, this 25 rem whole body value and the 300 rem thyroid value have been set forth in these guides as reference values, which can be used in the evaluation of reactor sites with respect to potential reactor accidents of exceedingly low probability of occurrence, and low risk of public exposure to radiation.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

APPENDIX B

TABLE 15-4

Calculated Radiation Dose to a Person at the SRP Site Boundary
Following Four Specific Accidents

Accident	Operating and Meteorological Conditions*	Calculated Dose, rem		
		Whole Body (2 hr)	Thyroid (2 hr)	Thyroid (120 hr)
Reference values for reactor siting in 10 CFR 100. ³		25	300	300
D ₂ O Spill	Typical Very Unlikely	0.007 0.14		
Discharge Mishap (one fuel assembly melts)	Typical Very Unlikely	0.0038 0.055	0.0078 0.12	0.018 0.29
Misloading Criticality (3% core damage)	Typical Very Unlikely	0.39 6.6	0.48 11.1	1.4 31.5
Hypothetical LOCA (1% core damage)	Typical Very Unlikely	0.13 2.2	0.16 3.7	0.46 10.5

*Typical conditions are 2500 MW reactor power, average (50%) meteorology, and 19-month service age carbon filters (carbon filter age is discussed in Section 15.3.2.2). Very unlikely conditions are maximum anticipated reactor power of 3000 MW, very unfavorable meteorology as specified in NRC Regulatory Guide 1.145 (95% site, 99.5% worst sector), and 19-month aged carbon filters. Values shown are maximum for any of the P, L, K, and C Reactors. The core inventory of tritium is included in the whole body calculations.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

APPENDIX C

Evolution of the Confinement Technology
at SRP Production Reactors

The production reactors at SRP were constructed in the early 1950s. The L-reactor, the third of five, began operating in July 1954. SRP originally controlled airborne radioactive releases by dispersion via tall stacks (DEIS, Vol. II, p. J-1). SRP also relied on the fact that the site extended over 300 square miles, thus permitting greater dispersion of radioactivity prior to reaching the site boundary. The L-reactor is some 9 km from the SRP site boundary (DEIS, p. 2-10). In 1958, the AEC's Advisory Committee on Reactor Safeguards (ACRS), after performing an extensive review of the SRP safety philosophy, concluded:

The buildings in which the SR reactors are housed do not possess any significant containment features, such as those now being provided for power reactors located in more populated areas. In the event of a serious accident that would breach the reactor tank and shield, the building shell in itself could not be expected to provide a third line of defense of any consequence on restraining the volatile fission products.

It was recommended that the Du Pont Company explore alternative paths toward obtaining a higher degree of confinement that is now in effect.

DEIS, Vol. II, p. J-7.

Also in 1958, the capacity of the SRP primary coolant pumps was approximately doubled (from 78,000 gpm to 150,000 gpm) which permitted a doubling of each reactor's power from about 1000 megawatts thermal (MWT) to approximately 2000 MWT (DEIS, Vol. II, pp. J-3 and J-6). Since the fission product inventory of noble gases and iodine is proportional to reactor power, this

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	change effectively doubled the magnitude of the consequences of a serious fuel meltdown accident. Since 1958, the power level of the production reactors has been further increased, and the L-reactor is currently expected to operate at 2350 MWt* (DEIS, Vol. I, p. 2-14). In 1960-61, in response to the ACRS criticism, SRP began a major confinement system improvement project. This system would remove airborne contamination, particularly iodine-131, through moisture separators, particulate filters, and halogen absorbers (carbon) in the process area ventilation exhaust stream (DEIS, Vol. II, p. J-7). This filtration system, while lowering the thyroid dose from halogen releases, was, however, incapable of removing noble gases, the primary contributors to the whole body dose. In the 1950s, there were no criteria specifying the degree of site isolation or reactor containment considered desirable for mitigating the consequences of severe reactor accidents. In 1962, after extensive public comment, the AEC promulgated the 10 CFR Part 100 site suitability regulations for licensed power reactors. Throughout the remainder of the 1960s, DuPont and the AEC examined a number of alternative containment/confinement proposals. Although some of these proposals, if adopted, would bring the SRP production reactors into compliance with 10 CFR Part 100, they were rejected because of their expense. Improvements were made in the confinement system in the 1970s, including the installation of a Confinement Heat Removal System to avoid overheating the filter system in the event of a full core meltdown. This system was needed because overheating the filters would reduce their retention capacity and cause desorption of the collected iodine (DEIS, Vol. II, p. J-13), thus defeating the purpose of the filters. This and other improvements, however, offered no reduction in the whole body dose due to accidental noble gas releases.	

*The highest power level achieved at SRP was 2915 MWt.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
ADDITIONAL COMMENTS MADE AT PUBLIC HEARING ON NOVEMBER 3, 1983		
BL-23	Now, let me add one or two other things. I just came, day before yesterday, from a conference in Washington, D.C. on the global effects of nuclear war which was where some of the top scientists from this country and also from the Soviet Union met to release their findings, principally on the thermal effects following the nuclear exchange. And they pointed out that the debris and soot that would be picked up by an exchange between the Soviet Union and the United States would lead to blockage of the sunlight for a month or more, several months before it cleared up, a year before it cleared up completely, and the temperature at the surface of the earth, average, over the Northern Hemisphere, would drop about 40 to 50 degrees Centigrade, and the loss of light would lead to the loss of photosynthesis. And, in effect, beyond the billion or so people you killed outright in a nuclear exchange, it would be credible that an equal number or larger number of the remaining survivors could not survive the aftereffects. Well, another thing they pointed out was that because the principal blockage of the sunlight comes from the soot that is produced by fires, that as little as 100 megaton exchange, say, from a thousand weapons of a tenth of a megaton each, would have similar effects. I mean, most of the effects could be produced by this small of an exchange. I just did a back-of-the envelope calculation, weapons stockpiled has about, oh, in the neighborhood of 7,000 megatons in weapons, in itself. This is in some twenty-six or so thousand weapons, and these are produced from about 80 to 90 tons of plutonium and six or seven hundred tons of highly enriched uranium. The L-Reactor, over a ten-year period, would produce somewhere on the order of five tons, more or less.	These comments are outside the scope of the EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Just scaling those numbers, you can argue that the L-Reactor would effectively produce over a ten-year period about 400 megatons, give or take a few hundred megatons of warhead yield, which is more than the minimum needed to essentially produce this newest catastrophe that has been identified. I raised that because I think that DOE has an obligation to discuss all foreseeable facts in the Environmental Impact Statement, and the effects of misuse of these warheads or use of them eventually is certainly one foreseeable impact that they must discuss.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF FRANCES CLOSE HART ENERGY RESEARCH FOUNDATION		
	I am Frances Hart and I represent the Energy Research Foundation. We have not yet had time to analyze the draft environmental impact statement as thoroughly as we intend, and will submit more extensive written comments before November 15th. I would just like to make some very general observations now. The point of an EIS - as we're all aware by now - is to provide for an assessment of the environmental impacts of a particular project as part of the planning to avoid environmental damage where possible.	
BM-1	Whether by design or mistake, DOE has given the impression that startup of L-Reactor will follow almost immediately upon completion of this EIS. That schedule would preclude implementation of any of the protective alternatives mentioned in the draft and by other sources. There are a number of technical experts analyzing the draft and possible environmental protection measures, and we expect DOE to seriously consider comments and suggestions for action. It is their legal obligation to do so and we consider it to be a substantive obligation to the states of South Carolina and Georgia as well. Those of us who have participated in this process find it disturbing that DOE seems not to be entertaining the possibility that plans could change in response to comments. Although renovation of the L-Reactor is completed, it is certainly not too late to make changes and reassess schedules, and we would remind DOE that it is incumbent upon them to consider the comments with an open mind. The protective measures described in the draft are generally dismissed because it is claimed that their implementation before startup would not allow production schedules to be met.	The EIS does not "dismiss" production alternatives or potential mitigative measures. Information with respect to meeting established needs and the technical feasibility of implementing mitigative measures are factors along with environmental consequences that are essential to making a "reasoned" decision. In accordance with the Council on Environmental Quality's regulations implementing the procedural provisions of NEPA, the Department's preferred alternatives are identified in this final EIS. The Department will base its Record of Decision on this final EIS, including the public comments. The Record of Decision will address alternatives considered in reaching the decision, the environmentally preferable alternatives, preferences for alternatives based on the technical, economic, and statutory missions of the agency, and whether all practicable means to avoid environmental effects from the selected alternative have been adopted.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BM-2	But recent statements from Dr. George Rathjens of the Massachusetts Institute of Technology and Dr. Thomas B. Cochran of the Natural Resources Defense Council have cast doubt on this assumption. According to Dr. Cochran, delay in startup of the L-Reactor for 36 months to implement necessary environmental control and safety systems would have no effect on national security. Dr. Cochran's comments on the draft EIS provide a detailed justification of this claim. And Dr. Rathjens stated that the draft "is totally unconvincing in justifying the need for increased production," and that "there is not likely to be any need for reactivation of the L-Reactor in the near future, and possibly ever." Given that the evidence to which we have access strongly suggests that delay of L-Reactor startup to allow implementation of protective alternatives would not have detrimental effects on national security, we would suggest that the following changes be made in DOE's plans for operation of that reactor. I repeat that we are not yet finished with our analysis of the draft EIS and that these recommendations are general ones which are by no means a comprehensive reflection of our concerns. However, we believe them to be sound and justifiable.	See the responses to comments AB-2 and AB-5 regarding information in the EIS on need and production alternatives, and the responses to comments AB-8, BL-15, BL-19, BL-20, and BL-21 regarding suggested production alternatives and need.
BM-3	First, DOE should implement some kind of cooling water discharge alternative to the presently planned direct discharge into Steel Creek. Some of the alternatives described in the draft would cause as much damage as would direct discharge and we would oppose any plan which would in effect make Steel Creek into a thermal mitigation zone. We would also oppose any alternative which does not result in compliance with state NPDES regulations in Steel Creek. The benefits from implementation of such a protective measure before startup would include the avoidance of severe thermal damage and of cesium remobilization.	Section 4.4.2 of the EIS, which discusses cooling-water mitigation alternatives, has been revised based on public comments received on the draft EIS. Specifically, Section 4.4.2 has been revised to provide a detailed discussion of additional combinations of various cooling-water systems. In Section 4.4.2, each of the cooling-water mitigation systems is evaluated for attaining the thermal discharge limits of the State of South Carolina. Section 4.4.2 and a revised Appendix I, Floodplain/Wetland Assessment, discuss the wetland impacts of each of the systems considered. The Department of Energy has been reviewing and evaluating alternative cooling-water systems for L-Reactor. Based on these reviews and evaluations, and consultations with

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BM-4	Secondly, we believe that DOE should complete the phaseout of all seepage basins at SRP before startup of the L-Reactor.	representatives of the State of South Carolina regarding a mutually agreed upon compliance approach, a preferred cooling-water mitigation alternative is identified in this EIS. This preferred cooling-water alternative is to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in the lake. The Record of Decision prepared by the Department on this EIS will state the cooling-water mitigation measures that will be taken which will allow L-Reactor operation to be in compliance with the conditions of an NPDES permit to be issued by the State of South Carolina.
BM-5	According to the draft EIS, normal operations of L-Reactor will involve the routine discharge of liquids contaminated with radioactivity from the disassembly basin at the reactor to an on-site seepage basin. This basin is now empty but remains contaminated from releases made during previous operation of the L-Reactor. According to DOE, the routine discharges "will cause contamination of the uppermost layer of the water-table aquifer (Barnwell Formation)." (DEIS, 4-26) DOE is assuming that this contamination will move laterally into Steel Creek rather than vertically into the lower aquifers. But DOE projections about groundwater movement have proven to be inaccurate in the past, as was the case in the M-area where the Tuscaloosa aquifer was contaminated by solvents from seepage basins despite DOE's claims that the aquifer was protected. Questions about increased groundwater use resulting from L-Reactor operations and the effect on head differentials under the L-Reactor (which I will discuss in more detail in a moment) make the reactivation of this presently dried-up and still irradiated seepage basin an option to be avoided.	See the responses to comments AJ-1 and BG-4 regarding seepage basins and ground-water contamination at SRP and DOE ground-water protection commitments. Section 4.4.3 discusses alternatives to the use of the L-Area seepage basin that are under consideration. Studies of the hydrostratigraphic units show that conditions at L-Area are different from those at M-Area (Sections 3.4.2.1 and 5.1.1.4). If the L-Area seepage basin is used, the analyses indicate that the filtered deionized disassembly-basin wastewater will seep into the shallow ground water and flow laterally to seepage springs along Steel Creek. The upward head differential between the Tuscaloosa and Congaree Formations at L-Area is presently about 3.7 meters. Projections indicate that this an upward head differential will continue to be present for 10 or more years after L-Reactor operation resumes; this includes the effects of increased pumping at SRP in support of L-Reactor. This head differential and the clay layers beneath L-Area tend to protect the Tuscaloosa Aquifer (see Section 4.1.2.2 of this final EIS). The SRP has discharged contaminated wastewater to seepage basins in the central part of the plant site since the mid-1950s. To date, there has been no contamination of the Tuscaloosa Aquifer in this area. Also, see the response to comment AJ-1 regarding seepage basins and ground-water contamination at SRP.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BM-6	There is known to be serious contamination of groundwater from seepage basins presently in use at a number of support facilities whose workload will increase with L-Reactor startup. The M-area I just mentioned and the chemical separations areas face a 33% increase in activity. It is presently planned to phase out use of seepage basins over a period of time, estimated in the case of the M-area basins to be by March 1985. To increase the load on these basins before protecting our groundwater from further contamination is unacceptable environmental practice - as is the use of seepage basins for waste disposal in general. Increased use of groundwater following L-Reactor startup adds to our concern in that possible impacts on head differentials at various places under the Savannah River Plant raise questions about deeper aquifer contamination in the future. According to the draft EIS: "Incremental ground-water pumping from the Tuscaloosa Formation, required to support the resumption of L-Reactor operation, will occur in five areas on SRP... The incremental withdrawal of water from the Tuscaloosa Formation at K-Area and the Central Shops will not affect the protection of the Ellenton and Tuscaloosa aquifers afforded by the upward head differential between the Tuscaloosa and Congaree Formations. In F- and H-Areas, this head differential no longer exists at the producing wells, and the downward head differential at these wells will be increased when the incremental pumping for L-Reactor starts. However, the hydrostratigraphic properties of the overlying wells will continue to offer protection to the Ellenton and Tuscaloosa aquifers at the pumping wells. At the seepage basins the head differential between the Tuscaloosa and Congaree Formations will be reduced by drawdown to about 3.6 meters in F-Area and to near zero in H-Area." "This is not the case in M-Area where the hydrostratigraphic characteristics of the subsurface materials are different from those in F- and H-Areas. In addition, the downward head differential between	DOE is committed to perform mitigative actions at SRP to reduce pollutants released to the ground water and to establish with the State of South Carolina a mutually agreed-on compliance schedule. Studies are being conducted on the phaseout of seepage basins at SRP. Also, see the responses to comments AJ-1 and BG-4 regarding seepage basins and ground-water contamination at SRP and DOE ground-water protection commitments. Sections 5.1.1.2 and 5.1.1.4 have been expanded to include a more thorough discussion of incremental ground-water impacts and the protection of public health and safety.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BM-7	the Congaree and Tuscaloosa Formations will be increased by about 2.6 meters at the M-Area seepage basins as the result of increased pumping to support the L-Reactor." (DEIS, 5-9, 5-12) According to Dr. A. R. Jarrett of the Department of Agricultural Engineering at Pennsylvania State University: "Page 3-25 and Appendix F [of the draft EIS] reveal an extensive review of the total heads existing at various locations within the SRP. These results are summarized several places, particularly Figures 3-8 and 3-9, which show most of the SRP to be in a zone of upward hydraulic gradient from the Tuscaloosa formation to the Congaree formation. The equal potential map, Figure 3-9, reveals the magnitude of these head differences ranging from an upward head difference of greater than 30 feet in the swamp region near the Savannah River where the Congaree is drawn down to support the flow in this river. As one moves northward, the upward differential decreases until it reaches an equal head condition near Par Pond and then a reversal implying that there is presently flow from the Congaree into the Tuscaloosa in the area of Par Pond. Figure 3-9 does not quantify the magnitude of this downward gradient but does suggest that Par Pond and the surrounding area is a recharge zone for the Tuscaloosa. This entire analysis is done using well data from the area, but nothing is said about the condition of pumping or the pumping history of wells used in the analysis when the head data were taken. It must be assumed that these data are under conditions of no withdrawal. The only pump drawdown data I could find in the report was on page 3-36 where drawdown values of 6 to 12 meters are suggested as typical for the existing withdrawal rates of the Tuscaloosa. If one superimposes these drawdowns to the stagnant well levels from the Tuscaloosa, the area of downward gradient enlarges as shown in	See the response to comment AW-1 which addresses Dr. Jarrett's remarks.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Figures 1 and 2.... Even using the 6 meter data enlarges the recharge area to include the L-Reactor area and during discharges creating a 12 meter draw-down essentially the whole SRP becomes a recharge area."	
	I am not a hydrologist, but I do know that such considerations are vital to an understanding of groundwater flow and therefore possible aquifer contamination. It is obvious that questions about hydrology remain unanswered.	
BM-8	In conclusion, the priority assumed in the following illustrative statement from the draft EIS is most disturbing: "If an engineering alternative cooling-water system is implemented after the restart of L-Reactor, successional recovery of the Steel Creek system would begin as soon as the alternative is implemented. Any alternative that postulates a delay of the restart necessarily results in a loss of production that cannot be recovered." Let us make it clear that we South Carolinians consider the protection of our environment to be a vitally important priority; indeed, it is part of our national security. We are very aware that damage to the environment cannot be undone easily, frequently not at all. We are being asked to accept the destruction of a large area of wetlands, the remobilization of curie amounts of cesium, further contamination of the groundwater and possibly of our sources of drinking water - all severe and essentially irreversible impacts. In expressing concern about the impacts we have frequently been told that the incremental dangers they represent are small and that we shouldn't worry. DOE also wants us to accept without question the assumption that a two percent increase in the plutonium inventory is worth the damages we must pay. We submit that the burden of proof is theirs; that it is to DOE to prove their case much more convincingly than has been done so far.	In Section 4.4.2, the EIS compares the implementation of cooling-water alternatives before and after restart. This comparison encompasses a number of factors. A loss of production is a factor that will be considered in preparing the Record of Decision. The Record of Decision will state the decision and any mitigation measures DOE will undertake. Also see the responses to comments BM-1 and BM-3 regarding the Record of Decision on this EIS and cooling-water mitigation alternatives.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	NATIONAL AUDUBON SOCIETY Southeast Regional Office P.O. Box 1268, Charleston, S.C. 29402 (803) 723-6171 STATEMENT OF TERRENCE C. LARIMER SOUTHEASTERN REGIONAL REPRESENTATIVE FOR THE NATIONAL AUDUBON SOCIETY ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR L-REACTOR, SAVANNAH RIVER PLANT AIKEN, SOUTH CAROLINA AT THE DEPARTMENT OF ENERGY PUBLIC HEARING BEAUFORT, SOUTH CAROLINA November 3, 1983	
	My name is Terrence Larimer. I am the southeastern regional representative for the National Audubon Society. Previous to my employment with Audubon I worked with the University of Georgia's School of Forest Resources, U.S. Forest Service and the U.S. Fish and Wildlife Service. The National Audubon Society is a private, nonprofit membership organization. We are dedicated to the conservation of wildlife and other natural resources and for the sound protection of our natural environment. Audubon has roughly 500,000 members and nearly 500 local chapters. We operate 75 wildlife sanctuaries and we publish AUDUBON magazine and AMERICAN BIRDS.	
BN-1	Our concern with the Draft Environmental Impact Statement (DEIS) on the Savannah River Plant L-Reactor centers primarily on its possible effects on wildlife habitat. Specifically, we are concerned with its effect on wood stork foraging habitat in Beaver Dam and Steel Creek Swamps. The DEIS acknowledges that wetlands in the Savannah River Plant (SRP) are important foraging sites for the nearby Birdsville Rookery of the endangered wood stork. However, the effect of the loss of these foraging areas, due to L-Reactor plant operation (high, hot, polluted water), on the colony is not discussed. We believe that these areas are critical to the continued success of the Birdsville Rookery and that this problem has not been adequately addressed.	See the response to comment AD-1 regarding the wood stork and foraging sites.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	It is a known fact that wood storks have high food requirements during the nesting season, 201 kilograms per nesting pair. It is also known that wood storks will abandon nests when food becomes a limiting factor.	
BN-2	The DEIS acknowledged the swamps of Beaver Dam Creek and Steel Creek are important foraging areas for the wood stork. Is it not likely that elimination of these foraging areas will reduce the food resource to a point where colonies might be abandoned during what would have previously been only moderately adverse natural conditions? That is, will not the colony fall much more often during periods of moderate stress after the loss of an important feeding area than it would have before that loss?	See the response to comment AD-1 regarding incidences of foraging at SRP locations and inclusion of more detailed data in Appendix C, Section C.3.2 of this EIS, and the response to comment AD-2 regarding abandonment of colonies.
BN-3	Along these same lines, not only are foraging areas along Beaver Dam and Steel Creek in jeopardy but current management practices on the SRP may be reducing other nearby foraging areas. Last year nearly 200 beavers were trapped in a three-month period on the SRP at a cost of \$15,000. Essentially all beavers were killed on the area. No information on the number of beaver traps, the number of trap sites, or trap site relation to actual beaver damage to railroad bed or roadway beds is mentioned.	Due in part to a lack of natural predators, the beaver population on the SRP has increased markedly in recent years. Because beaver activity has had adverse impacts on (1) 750 acres of timber, (2) environmental monitoring of streams, and (3) damaged roads and railroads, consultations were held with the U.S. Fish and Wildlife Service and the South Carolina Wildlife and Marine Resources Department. An evaluation of several alternative actions recommended that a selective trapping program be implemented at 34 areas. During a 3-month period, 196 beaver were trapped and removed at a cost of \$16,231.50. This management approach has not eliminated the entire beaver population on the SRP.
BN-4	I raise these questions because of the concern over the relationship between beaver ponds and foraging areas for wood storks. It is a well known fact that beaver ponds provide valuable wildlife habitat for many species. It is likely that they provide excellent foraging habitat for wood storks. This is a question that has not been addressed and should be.	Wood storks from the Birdsville colony commonly used black gum (<i>Nyssa sylvatica</i>) and cypress swamps for foraging. Black gum swamps comprised 33 percent of the foraging sites. Beaver probably used many of these sites sometime in the past. The most productive stork foraging site in terms of fish resources (biomass per square meter) was a recent beaver-dammed black gum swamp. Wood storks probably benefit from foraging habitat created by beaver dam construction.
BN-5	The question of mitigating loss of critical foraging areas is not adequately discussed in the DEIS. It should be. How will this habitat be replaced?	Mitigation of foraging areas in the Steel Creek swamp might be accomplished through the implementation of the alternative cooling systems discussed in Section 4.4.2.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BN-6	Surrounding foraging areas are primarily on private lands which are under increasing pressure to drain and clear for agricultural use. Indeed, the annual flooding and concurrent resupply of forage fishes to the waters associated with the Savannah River Swamp System make the Beaver Dam Creek and Steel Creek areas especially valuable to foraging wood storks. More valuable than nearby wetland areas which are not annually flooded by the river. The supposition that wood storks will simply move into "other" areas if Beaver Dam Creek and Steel Creek are lost to them is at best wishful thinking. Cumulative loss of wetlands to agricultural use and L-Reactor operation will likely prove fatal to this important segment of endangered species population. This question should be more carefully examined in the final Environmental Impact Statement.	See the response to comment AD-10 regarding habitats for the wood stork.
BN-7	Indeed the entire question of the effect of L-Reactor start-up of the Birdsville Rookery needs further examination. The majority of the DEIS information on wood storks is based on data gathered during less than half of last year's breeding season. This is obviously not a large enough data base to form any sound conclusions.	See the response to comment AD-3 regarding inclusion of more detailed data in Appendix C, Section C.3.2 of this EIS.
BN-8	In conclusion the DEIS for L-Reactor operation on the Savannah River Plant is woefully inadequate in its handling of possible impacts on the wood stork population of the Birdsville Rookery. The importance of foraging habitat in Beaver Dam Creek and Steel Creek and the effect of their loss on the rookery needs further examination. Possible mitigation schemes should be explored and enhancement of alternative feeding areas considered.	See the response to comment AD-2 regarding the use of foraging sites at SRP versus sites not located on the SRP.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	R. I. (BOB) NEWMAN 388 Wahoo Drive Fripp Island, S.C. 29920 PREPARED STATEMENT PUBLIC HEARING DRAFT ENVIRONMENTAL STATEMENT, L-REACTOR OPERATION, SAVANNAH RIVER PLANT November 3, 1983 I am Robert I. Newman, residing on Fripp Island, here in Beaufort County and a consumer of water from the Beaufort-Jasper water system. I am a Chemical Engineer, registered in South Carolina and New Jersey. I worked for Allied Chemical Corp. for 37 years--the last 15 in various nuclear-related projects (including 7 years with Allied-General Nuclear Services). I was elected a Fellow of the American Institute of Chemical Engineers and a Diplomat of the American Association of Environmental Engineers. I served one year on the Clemson University Board of Visitors. Before endeavoring to counter some of the most often voiced objections to the restart of the L-Reactor, I would like to put forth several basic considerations. I, personally, feel these are factors which should be taken into account in the making of any decision affecting, among other things, our environment. I think they are important to the future of the nation. I hope they are considered important to the DOE in this matter. I wish they were in the reasoning process of those opposing the restart. First, our resources of both money and people (both technically trained and leaders) have a finite limit. Any wastage of either must divert resources away from other, maybe more important, activities. We hear often that other countries are getting ahead of us in technology. We all know our government is running with enormous deficits. I think we would all like to see our people in Congress spend more time constructively acting to stop the arms race; but there are only 24 hours in a day	Comments noted.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	and unnecessary time spent on one matter is time not available for other matters.	
	Second, we can never achieve the "best" solution to any problem. Regardless of what remedy is developed, some ambitious research person is going to come up with an idea that might be better. What we must strive for is solutions which are adequate to serve the necessary purpose--not the most elegant. Our decision process must consider the alternatives and their costs in dollars, time (which often equates to dollars) and other resources.	
	Third, try as we may, we can never achieve perfection or an activity in which there is no risk. Yet, we see time and time again the spending of enormous resources to avoid miniscule risks because of emotion or unfounded cries of concern.	
	Fourth and finally, one must compare one risk (both magnitude and likelihood) with others we may better understand and accept. I, personally, cannot accept the argument that nuclear risks are different because they are not our personal choice, while flying in an airplane (for instance) is an activity in which we do not participate unless we choose to do so. When I walk down the sidewalk, if a drunken driver swerves off the street and hits me, that is not by my choice, but I am sure statistics show more people have been killed by such an accident than by the handling or manufacture of nuclear materials.	
	Now I would like to comment on several of the objections to the restart of L-Reactor as voiced in the record I have seen. These are not necessarily in order of importance but rather in the order I noted them as I read the absurdly lengthy transcripts and letters on this matter.	
	<u>LOSS OF WETLANDS HABITAT AND DANGER TO ENDANGERED SPECIES</u>	
	This may be the most picaresque objection raised against the restart. Of the SRP area, only some 12% of the wetlands will be affected. Looking at it another way, only some 2.5% of the site will be affected by the hot water from the operation of the L-Reactor. Maybe those objecting do not know that wildlife can walk or fly to unaffected areas. Maybe they do not want to realize that the SRP area is probably the finest	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	wildlife refuge in South Carolina--keeping even the "econuts" from disturbing the wildlife. Do they know about the Savannah River Ecology Laboratory which is doing such a fantastic job because of the efforts funded by the DOE and the lack of people on the site? There is an artificial lake on the site--Par Pond. This lake receives hot water from reactor operations. When I lived in Barnwell, I heard many times of local fishermen sneaking into Par Pond (sometimes caught) to catch the large fish in the pond--thermal pollution? To carry out many additional studies, to build cooling towers to avert a non-problem is a lovely example of waste of resources. <u>IMMEDIATE OR CUMULATIVE RADIATION EFFECTS</u> I have no quarrel that an excess dose of radiation will harm me--or anyone. But I compare this with being hit with a wheeled vehicle. I'd be dead if it were a 10 ton truck going 50 miles an hour. I would not be hurt so much if it were a tricycle ridden by a four-year-old. Similarly, a radiation dose of 500,000 millirem might kill me. One millirem won't! I touched above on comparisons. Let's look at some here. The estimated impact on nearby residents from airborne releases will be less than 0.5 millirem per year. The dose to consumers of Beaufort-Jasper water might reach less than 0.05 millirem per year. These are above background radiation levels--the natural radiation we are all exposed to in this area. Now let's look at the comparisons. Should the Rocky Mountain area (like Denver) be posted "TO ENTER THIS AREA IS DANGEROUS TO YOUR HEALTH"? Its radiation level is 100 millirem higher than the good people of South Carolina will be exposed to because of L-Reactor restart--and Denver does not have a high cancer incidence. Our worthy Legislators spend a lot of time in the State House in Columbia. Columbia itself has a higher background radiation level than Barnwell or Beaufort because of higher altitude (cosmic radiation) and the composition of the ground (more radioactive). But also, a radiation survey of the State House has shown that, because of the radioactive granite used in its construction, radiation levels are quite high--as much as 500 millirem above background outside the Governor's Office. There are many areas of South Carolina where radiation levels are higher than those to which the good people of Beaufort might be exposed from the restart of L-Reactor because of altitude or rock (radioactive) outcropping. I cannot	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	understand why some people of Beaufort will travel to Aiken or take so much other time to protest an activity which might subject them to an exposure to a carcinogen (radioactive material) at a level of, say, 1% of the federal limit when they are silent on the fact that their water company regularly delivers water to them with trihalomethane (another carcinogen) content exceeding the federal limits--over 100%! Such misdirected concern can only lead--or try to lead--to a real waste of resources if this miniscule exposure is required to be reduced.	
	<u>CONSEQUENCE OF ACCIDENTS</u>	
	One fundamental consideration in the assessment of the consequence of an accident in nuclear activities is the "stored energy" which can disburse radioactive material. Unlike a nuclear power plant, L-Reactor will operate at low pressures and temperatures. Accordingly, there is not the high temperature nor the high pressure potential to spread fission products into the environs as one might believe. However, there is a real consideration that most people like to overlook. There are natural processes, not a function of engineering or construction that cannot be ignored, though they have occurred repeatedly in nuclear mishaps. There have been reactor accidents in the U.S., in Canada, in England. In every case, the actual release was a factor of 1,000 to 100,000 times less than what had been predicted to result (using models similar to those on which the minimal releases from L-Reactor were calculated). This is really not surprising when one appreciates the natural phenomena such as agglomeration, condensation, impingement, etc. which take place regardless of design. Another factor which comes into play--and certainly did at TMI--is that two of the radionuclides of most concern, cesium and iodine, are both volatile. However, they also have a great affinity for each other and promptly combine chemically to form cesium iodide, which is not volatile and settles out on surfaces or is caught in the filter system.	
	<u>CONTAMINATION OF THE TUSCALOOSA AQUIFER</u>	
	I was responsible for the hydrology studies for the Barnwell nuclear plant, downstream from the SRP above the Tuscaloosa. Our studies clearly showed that the Tuscaloosa was under a	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	hydraulic head higher than the overlying aquifers, so that any flow between them would be from the Tuscaloosa up, not from the upper aquifers down into the Tuscaloosa. The L-Reactor Environmental Assessment supports this on page 3-16. Granted there are holes in the aquiclude above the Tuscaloosa, but that aquifer is so immense that any loss of its water through these holes, or abandoned wells, is insignificant. <u>NEED FOR PUBLIC PARTICIPATION</u> When NEPA was enacted over a decade ago, I cheered it because I perceived that it would require that decision makers would have to take into consideration some of the basics I earlier listed like weighing of alternatives and conservation of resources in a realistic manner. My current perception is that NEPA has been prostituted and is being used by those opposing any action they do not favor to delay and delay the action--in many cases killing it just by the passage of time, not for any real, proven or demonstrated reason. Here, with L-Reactor restart at stake, the public record of operations at the Savannah River Plant--especially the reactors--clearly refutes the cries of opposition. Publishing of the Environmental Assessment gave further support. Yet poorly founded objections have resulted in the expenditure of large sums of money (some of it supplied by me in taxes), the waste of many hours of time of highly qualified people who could have been working productively, and the diversion of the efforts of Members of Congress, State leaders and federal and state regulatory agency people. I can see no evidence that any objector has shown and proved there will be any significant impact from the operation of L-Reactor when judged against rational criteria. In this regard, it is notable that, with no exception I have found, the people of nearby communities give full support to the restart-opposition coming from those with less familiarity with SRP operation. Nearby residents work at the SRP, have relatives or friends working there or have retired, in good health, from working there. If any objector wishes to counter this by saying they are doing this, knowing there is danger, let them say so, face to face, to these people, telling them they are deliberately jeopardizing the future of their friends or their children. Many of the Health Physics professionals working at the plant are parents, they know the effects of radiation. Does anyone	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	really think they are disregarding the future of their own children? <u>CONCLUSION</u> This has not, obviously, been a technical presentation. The record is replete with technical facts. But many people either do not understand or they prefer to ignore facts in preference to emotion. Let me close by mentioning an article I wrote which was published last December in THE STATE and in THE BEAUFORT GAZETTE. It compared many of the objectors to nuclear activities to Chicken Little--the misguided creature which, after being hit on the head, went around saying, "The sky is falling." While unfounded, its cries alarmed many others. The article led off, "Why can't South Carolina get away from the 'Chicken Little Syndrome' (the sky is falling)? Many reporters and editorial writers grossly distort the picture of nuclear activities from the factual situation. The same goes for a number of our leading politicians." Thank you for letting me participate in this waste of time. R. I. Newman, P.E.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF REPRESENTATIVE HARRIET KEYSERLING BEFORE THE DEPARTMENT OF ENERGY HEARING NOVEMBER 3, 1983		
I appreciate the opportunity to appear before you today. I do not have a scientific background, so as I read the Draft Environmental Impact Statement, I was examining the process by which you will make your decisions more than the scientific data. I am glad that others here will speak with knowledge and authority on the technical and scientific aspects of the EIS.		
BP-1	At your May 27, 1983 hearing, I stated that it was my opinion that nuclear hazards are nuclear hazards, whether they be related to commercial or defense facilities; and therefore, nuclear safety criteria and standards should be the same for all. For that reason I supported an EIS for the L-Reactor. For the same reason I urge you again, as you listen to the responses and testimony submitted to you this week, to make decisions which will require of the L-Reactor the same standards for the protection of health and safety as are required of commercial facilities.	Chapter 7 of the EIS presents the Federal and state environmental protection regulations that are applicable to the restart of L-Reactor. The restart of L-Reactor will comply with all of these regulations. For example, the proposed restart of L-Reactor will be in compliance with an NPDES permit issued by the State of South Carolina, and the restart of L-Reactor will be in compliance with DOE radiation protection standards that are comparable to those of the Nuclear Regulatory Commission (10 CFR 20) for a production facility (i.e., 500 millirem to the whole body in any one calendar year). With respect to engineered safety features such as a containment dome, the need for specific engineered safety features is based upon limiting potential radiological consequences. The potential radiological consequences are related to the design and operation of the specific type of reactor being considered; for example, the Fort St. Vrain reactor, which is a gas-cooled commercial reactor in Colorado, has no containment dome and was licensed for operation by the NRC.
BP-2	As I read through the Draft EIS I had an uneasy feeling that, as alternatives were evaluated and weighed, the overriding considerations were time and expense, and that alternatives which could not meet the January 1, 1984 start-up were not seriously considered. I sincerely hope this is not so, for the health and safety of the people of South Carolina and Georgia, now and for future generations, must be considered equally.	The purpose of the EIS is to evaluate the environmental consequences of the proposed restart of L-Reactor. In accordance with the Council on Environmental Quality's regulations implementing the procedural provisions of NEPA, the Department's preferred alternative (including mitigation alternatives) are identified in this final EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
I would like to say, in closing, that I was pleased to read of the broadening of the health studies of cancer and infant death, a subject of great concern here. We will be waiting anxiously to learn the results.		The Record of Decision on this EIS will state the alternatives to be implemented. The Record of Decision will address the alternatives considered in reaching the decision, environmentally preferable alternatives, and preferences for alternatives based on technical, economic, and statutory missions of the agency, and whether all practicable means to avoid environmental effects from the selected alternative have been adopted.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF THE LEAGUE OF WOMEN VOTERS OF NORTHERN BEAUFORT COUNTY AT A DOE HEARING ON THE DRAFT EIS OF THE L-REACTOR AT THE SRP Nov. 3, 1983		
		I am Dr. Zoe Tsagos. I appear before you for the third time as the representative of the LWNBC where I hold the Energy Chair.
		Since today's meeting is about the Draft EIS on the restart of the L-Reactor at the SRP, we have decided that we would concentrate on the Draft EIS response to the five recommendations which we presented at the Scoping meeting in August. Having read all the presentations made by individuals and by organization representatives at the four scoping meetings as published by DOE, we feel sure that other aspects of the L-Reactor start-up will be covered, either here or at the other hearings.
		At the scoping meeting our fourth recommendation concerned itself with safety planning and the steps to be taken during a serious accident at the SRP, onsite and offsite. We stressed the importance of letting people know how an emergency would be handled.
		Both in the body of the EIS (4.2.1.3.) and in Appendix (H) a carefully delineated program of safety measures is presented. We quote from Appendix (H.2.1.) the following two statements: "The DOE-SR is developing a set of 11 Emergency Management Plans for managing emergencies on and off the SRP (DOE, 1983 a-k)" and "DOE-SR has recently entered into agreement with lead agencies of South Carolina (DOE, 1983m) and Georgia (DOE, 1983n) to prepare such plans."
		The point we wish to stress here is that although in the thirty years of operation there was apparently some liaison with key persons in Georgia, South Carolina and the South Carolina counties within 80 kilometers of the SRP in case of an emergency, the concept of carefully developed step by step action apparently is a recent program from the dates cited above. We find this clear cut response encouraging. There was no indication of any of this in the EA.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BQ-1	We are disappointed that nothing is planned before start-up about the problems of ground water usage and contamination. We had presented as our one recommendation that the seepage basins be replaced by other means of containment of radioactive and nonradioactive chemical wastes. Instead, we have the following (Draft EIS 5.1.1.2.): "The chemical separations of product and waste from the irradiated L-Reactor fuel and target assemblies will result in additional effluent discharges to the seepage basins at the chemical separations areas. Based on past experience, about 1.5 kilograms per year of mercury ... and larger quantities of other chemicals ... are expected to be discharged to seepage basins in the F- and H-separations areas due to the operation of the L-Reactor ... In addition, approximately 7 kilograms per year of the chlorinated degreasing solvent (1,1,1 trichloroethane) and quantities of other chemicals ... will be discharged to the seepage basin in the fuel and target fabrication area ..." In an interview on July 1, 1983 with Roger E. Davis, Assistant Deputy Commissioner of Environmental Quality Control at the South Carolina DHEC by a member of the staff (see <u>Research Exchange</u> published by Energy Research Foundation, July-August 1983, pp. 4, 5, 6, 12) Mr. Davis spoke of the Clean Water Act of 1977 and about the permitting system which passed into the jurisdiction of the states. Before April 1, 1983 the SRP permits had been issued by EPA. When SCDHEC was asked for permit renewal, it was found that SRP was in violation of water quality standards. Asked about his main concern, Mr. Davis named ground water contamination through seepage basins, lagoons, and other disposal sites. SRP is asking for a variance so that it can operate the L-Reactor while at the same time develop a study on alternative means for nuclear and non-nuclear waste storage. Until the study is completed, the ground water pollution will worsen.	See the response to comments AJ-1 and BG-4 regarding seepage basins and DOE's commitments for ground-water protection, and the response to comment BA-5 regarding disposal of high- and low-level radioactive waste.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BQ-2	We are also disappointed that no cognizance has been given to our third recommendation to the need for an outside, independent group to oversee SRP operations along with government agencies such as DHEC and others. There are universities and colleges in both South Carolina and Georgia from where knowledgeable, good citizens can come to perform this public service. There are other citizens' groups which can be called upon. There is one other factor which must be taken in consideration--the lack of funds to do an effective job of monitoring such as installations at SRP. In the aforementioned interview with the DHEC Deputy Commissioner, Mr. Davis responded to a question on funding the work of DHEC at the SRP by saying that it has been hampered by lack of funds because the South Carolina Legislature feels that part of the money should come from the federal government and added, "So far we have not received any indication that the federal government is going to provide these resources." (reference as above p. 12.) A dedicated group with scientific know-how could be of assistance to augment the limited forces that DHEC now commands.	DOE-owned, contractor-operated facilities, such as the Savannah River Plant are excluded from NRC licensing requirements under Section 110(a) of the Atomic Energy Act as amended. DOE is therefore responsible for protecting the safety and health of the public and the environment from the effects of activities at DOE nuclear facilities. To assure the health and safety of the public and to protect the environment, DOE provides an effective, independent health and safety overview function through the Assistant Secretary for Policy, Safety and Environment, who has no program responsibilities with respect to the nuclear programs of DOE. The health, safety, and environmental protection requirements and programs of the Assistant Secretary are implemented through a series of Orders and regulations by DOE program personnel. The DOE program personnel are then responsible for assuring contractor compliance. Within DOE, the health, safety and environmental protection responsibilities are a line management responsibility assuring clear lines of authority in implementing requirements, and also assuring that health, safety and environmental protection is an integral part of each program maximizing the sensitivity of all program personnel to requirements. In addition to the health, safety and environmental protection programs of DOE, oversight is also provided through the monitoring of SRP activities and joint participation in studies by several state and Federal agencies as discussed in Chapter 6 of this EIS. These programs and studies include the Georgia Department of Natural Resources (radioanalysis of fish near SRP and crabs and oysters near the seacoast and monthly analysis of 13 water-quality parameters), South Carolina and Georgia (air-monitoring network, including eight sampling stations near SRP), U.S. Geological Survey (continuous monitoring of river flow and temperature above and below the SRP), National Centers for Disease Control (epidemiological studies), and the Academy of Natural Sciences of Philadelphia (long-term aquatic and water-quality studies in the Savannah River near SRP). The current reports documenting the radiation monitoring programs of the states are <u>Environmental Radiation Surveillance Report, Summer 1980-Summer 1982</u>, Georgia Department of Natural Resources, and <u>Nuclear Facility Monitoring</u>, South Carolina Department of Health and Environmental Control.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		Other independent oversight activities initiated by DOE include long-term aquatic and water-quality studies in the Savannah River near SRP by the Academy of Natural Sciences of Philadelphia, epidemiological studies by the Los Alamos National Laboratory and by the Oak Ridge Associated Universities, independent environmental studies of the SRP site by the University of Georgia's Savannah River Ecology Laboratory, and the conduct of consultations with the U.S. Fish and Wildlife Service and National Marine Fisheries Service on endangered species. DOE has also initiated a 2-year program to determine the environmental effects of cooling-water intake and discharge of the SRP production reactors. The States of South Carolina and Georgia, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers are participating in this program. See also the response to comment CX-3 regarding DOE's response to the GAO report entitled "Better Oversight Needed for Safety and Health Activities at DOE's Nuclear Facilities."
M-170 BQ-3	We still would like to see the L-Reactor on a stand-by basis, as we indicated in our fifth recommendation, until the vitrification of high level radioactive waste be made possible. It is a pity that the building of the Defense Waste Processing Facility had not been started earlier to perform this very needed operation. The Draft EIS states that it will be put on stream in 1989. (Draft EIS 5.1.2.8.)	As stated in Section 5.1.2.8, the volume of high-level radioactive waste to be generated by chemical processing of L-Reactor material was considered in the EIS for the Defense Waste Processing Facility (DWPF); this facility is presently under construction at SRP. This waste will be stored temporarily in Type-III double-walled tanks, which have experienced no leakage, until the DWPF begins to immobilize SRP high-level waste. Also see the response to comment BA-5 regarding high-level waste disposal.
BQ-4	Finally, we come to our first recommendation made at the Scoping Hearing; a recommendation of particular importance to us who drink the Savannah River water. This has to do with thermal effluent which will further degrade the Savannah River as soon as the L-Reactor goes in production.	See the response to comment AA-1 regarding cooling-water mitigation alternatives and issuance of an NPDES permit for L-Reactor.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	We here quote our recommendation, in part, as we presented it in August. "... we strongly recommend that a method of cooling the reactor effluent be introduced either by recycling, by cooling pools or by any other acceptable method which will cool the emissions to the standard of 90°F acceptable to South Carolina DHEC." Since 1977 with the passage of the Clean Water Act there has been further enabling legislation. One of these laws is connected with permit issuance to companies that are not polluting and qualify under the Clean Water Act. This is the National Pollutant Discharge Elimination System (NPDES). Since SRP does not qualify under NPDES, it has asked DHEC to allow the L-Reactor start-up and to run for five years during which time an alternative method of cooling the effluent would be worked out. It is our understanding that DHEC with some modifications will grant the permit, or at least that was Mr. Davis' position in July before the issuance of the Draft EIS.	
BQ-5	We wish to end this presentation with a quotation from a draft position paper which was prepared by the staff of the Natural Resources Defense Council and was to be sent to DOE in its final form in July. On page 5 under "Production Alternatives" occurs the following statement: The Draft EIS should consider as a reasonable alternative a delay in the operation of the L-Reactor for an extended period to allow the implementation of "mitigative alternatives" combined with, if necessary, the alternatives of (1) boosting throughput at the SRP reactors and the N-Reactor and (2) Accelerating the recovery of nuclear materials from the retirement of obsolete warheads. In regard to the first, DOE now plans to install the Mark 15 core in one of the SRP reactors, which will increase its plutonium production by approximately 25%. The Draft EIS should address the possibility of the use of such cores in one or more additional reactors. Although the Draft EIS shows no inclination on the part of DOE to delay in starting the L-Reactor, perhaps a reconsideration may be possible at what is proposed above.	See the responses to comments BL-15, BL-19, and BL-21 regarding production alternatives.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BQ-6	We do not find what we have learned from the Draft EIS reassuring. We are aware that with the start-up of the L-Reactor there will be four polluting sources in the SRP rather than three and they will be under less rigid control than say the commercial Georgia Power Vogtle plant nearby. Thank you, Mr. Chairman.	See the response to comments AA-1 and AA-3 regarding issuance of an NPDES permit and DOE's commitment to comply with all applicable Federal and state environmental protection requirements, and the response to comment BQ-2 regarding independent monitoring and studies.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF SISTER ELLEN ROBERTSON		
BR-1	I'm Sister Ellen Robertson. I'm an Adrian Dominican sister, and I speak as an individual. I would like to briefly address a couple of concerns on the environmental aspect, and basically I believe that the whole thing is being rushed, and with the knowledge we have of things that have happened in other parts of the world concerning nuclear--the materials that go into making nuclear arms.	The Department followed the Council on Environmental Quality regulations [40 CFR 1506.10 (c)] for the comment period on the Draft EIS. The Energy and Water Development Appropriations Act, 1984, allowed the Secretary of Energy to reduce the comment period to 30 days. The Secretary chose not to exercise this option and allowed the full 45-day review period as requested by several comment letters submitted during the scoping period. DOE has made every effort to involve the public in the NEPA process for L-Reactor through several public hearings and public comment periods, including the opportunity to comment on the adequacy of the EIS and the merits of the alternatives discussed in the EIS before it issues the final EIS. DOE will consider all substantive comments before it issues its Record of Decision on this EIS.
BR-2	The rushing into something that can potentially have an impact on people's lives, I believe, has to have serious consideration, and I would hope that the time would be given to study particularly those areas that were brought up in the study and have been brought up by other people as being very questionable concerning the effects on the groundwater and the Savannah River water and the environment that affects the people in the Savannah River Plant area, not just in the immediate area, but downwind.	As stated in Chapter 6 of the EIS, DOE has maintained an intensive surveillance program both onsite and offsite, including beyond the mouth of the Savannah River. DOE maintains sampling stations for air quality, sediment, soil, ground water, vegetation and food, drinking water, aquatic biota, and radionuclide and heavy-metal concentrations downriver from SRP to the mouth of the Savannah River and in several cities and counties in both South Carolina and Georgia to assure compliance with both state and Federal statutes and regulations in environmental protection.
BR-3	There has been a recent study on the effect this has on the unborn, and I would just like to make that recommendation.	See the response to comment AV-8 regarding health effects studies of the population around SRP.
BR-4	My other concern has to do with the need, which is addressed in the document, the need for reopening the L-Reactor. I believe it's a moral question, and the bishops, the National Council of Catholic Bishops in the peace pastoral, "God's peace and our	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	response," I would like to briefly read from the peace pastoral regarding the use of nuclear weapons for which the L-Reactor is being restarted in order to provide plutonium for more weapons that are going to be made. This is a direct quotation. "We do not perceive any situation in which the deliberate initiation of nuclear warfare on however restricted a scale can be morally justified. Nonnuclear attacks by another state must be resisted by other than nuclear means. Therefore, a serious moral obligation exists to abolish nuclear defense strategies as soon as possible." Thank you.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF SISTER MIRIAM BAUERLIN		
	I'm Sister Miriam Bauerlin, a Franciscan, from Maryland.	
	I just want to speak to two points. They are in the area of health and safety.	
BS-1	I read in the newspaper that materials from nuclear weapons that are either unused and will always be unused because they are outmoded can be used for future weapons. I just would like to see that commented on, if that is a possibility.	See the response to comment BL-19 regarding utilization of material from retired weapons to meet new defense nuclear material requirements.
	The person who spoke, and I don't remember his name, was a person who is involved in nuclear weaponry.	
BS-2	Secondly, in regards to the environmental safety, what attention has been given to the security and safety of the states of South Carolina and Georgia in light of the recent Beirut tragedy this country has suffered from a terrorist attack? It would seem to me that although it may be somewhat far reaching to think about that, it could be a possibility of an air, kamikaze-type suicidal attack or other modes that the terrorists can dream up, and therefore, really put Georgia and South Carolina and a few other states totally out of commission.	See the response to comment BG-9 regarding emergency response planning.
	That's it.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	THE GEORGIA CONSERVANCY Coastal Office 4405 Paulsen Street Savannah, Georgia 31405 (912) 355-4840 STATEMENT OF HANS NEUHAUSER AT THE DEPARTMENT OF ENERGY'S PUBLIC HEARING ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT ON THE PROPOSED RESTART OF THE L-REACTOR AT DOE'S SAVANNAH RIVER PLANT Savannah, GA November 4, 1983	
	Mr. Chairman, I am Hans Neuhauser, Coastal Director of The Georgia Conservancy. I appreciate the opportunity to present additional testimony on the proposed restart of the L-Reactor. These comments are being made on behalf of The Georgia Conservancy. They are also intended to supplement comments made earlier at previous hearings on this issue and in other communications. Central to the final decision on the restart of the L-Reactor is the question of need. We would like to make it clear that we are not debating the issue of whether there is or is not a need for all the products of the L-Reactor at this time. Nor are we debating the United States' foreign policy, particularly in regard to the role that nuclear weapons play in determining the credibility of this country's relationship with the Soviet Union. We can only assume that the needs are legitimate and that appraisals independent of the Department of Energy and the Administration will verify the conclusions presented in the classified Appendix A.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BT-1	Assuming that the needs truly exist, then we have to ask whether the immediate restart of the L-Reactor is the only means by which those needs can be met. Are there other ways in which the needs can be met and have less impact on the health, safety and welfare of the citizens of Georgia and South Carolina, and which will have less adverse impact on the environment?	See the responses to comments AB-2 and BL-15 regarding need and production alternatives.
BT-2	After all, we should not have to accept the contamination of our surface and ground water with cesium, cobalt, tritium, and other radioactive and toxic materials if there is a reasonable alternative.	DOE is committed to conducting its operations in a way that ensures the health and safety of the public and the protection of the environment. Thus, considerations affecting the decision to restart L-Reactor operation will include practicable mitigation measures to minimize adverse effects and still meet national defense needs. As noted in Section 4.1.1.5, water quality samples from the Savannah River indicate little variation in measured indicator parameters and chemical constituents between monitoring stations upstream, adjacent to, and downstream from SRP. The EIS assesses nonradiological liquid releases directly to onsite streams and those released to onsite streams via a ground-water path from seepage basins (Sections 4.1.1.5 and 5.1.1.2). Section 5.1.2.7 of the EIS discusses the doses to the public from L-Reactor-related radiological liquid releases. Any radio-cesium and radiocobalt that is remobilized in Steel Creek and transported to the Savannah River will be within EPA drinking water standards (Section 4.1.2.4). Also see the response to comment AA-1 regarding cooling-water mitigation alternatives, the response to comment AA-2 regarding radiocesium and radiocobalt concentrations, and the response to comment AJ-1 regarding seepage basins.
BT-3	We should not have to accept the destruction of 1000 acres of wetlands and important, if not critical, habitat for at least three endangered species if there is a reasonable alternative.	Impacts to wetlands and endangered species are addressed in Sections 4.1.1.4, 4.4.2, 5.2.4, and Appendix I of the EIS. None of the habitats that will be impacted by the restart of L-Reactor have been designated as "critical" by the U.S. Fish and Wildlife Service. Also see the response to comment AA-1 regarding cooling-water mitigation alternatives and the response to comment AY-2 regarding presentation of current information on the status of endangered species in this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BT-4	We should not have to accept the release of radioactive substances into the air we breathe if there is a reasonable alternative.	The radioactive materials produced and utilized at SRP are contained and handled in an environmentally safe manner. Any radioactive releases to the environment that do occur as a result of normal operations are maintained well below allowable limits. The SRP operating philosophy is to reduce such releases to levels "as low as reasonably achievable" in accordance with DOE guidelines contained in DOE 5480.1A, <u>Environmental Protection, Safety, and Health Protection Program for DOE Operations</u> .
BT-5	We should not have to accept increased risks to our health, our safety and our environment if there is a reasonable alternative.	The EIS contains thorough discussions of risks to the public health and safety and to the environment as a result of the restart of L-Reactor. As contained in the EIS, any exposure of the public to radiation resulting from L-Reactor restart would be minimal compared to the exposure from natural or other manmade radiation sources. The risks due to possible reactor accidents are also small.
BT-6	Is there such a reasonable alternative? The Draft EIS, which is supposed to thoroughly discuss alternatives, does not provide enough information on the viability of alternative approaches. Several alternatives have been presented by others that appear to be able to meet, or approximate, production needs while simultaneously reducing the environmental impacts and risks. One promising alternative is that presented by Dr. Thomas Cochran, a senior staff scientist with the Natural Resources Defense Council. Dr. Cochran's alternative, presented earlier in this sequence of hearings, has four major components: (1) accelerate the timetable for the use of the Mark-15 fuel lattice at SRP by one year, (2) initiate production of "less than 6 percent plutonium 240" at the Hanford, Washington N-Reactor, (3) accelerate the starting date for the Purex reprocessing plant at Hanford, Washington by two months and (4) include in production calculations the excess plutonium that has been produced over and above goals.	See the responses to comments BL-15, BL-20, and BL-21 regarding production alternatives. Section 2.1.2.2 of the EIS provides additional information on the environmental effects of N-Reactor operating at a 5-percent plutonium-240 content.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Would this or some other combination of production programs meet the needs? The Draft EIS is insufficient in that it does not discuss these alternatives thoroughly enough to allow a prudent judgement. (For example, the Draft EIS notes that the environmental impact of the Hanford N-Reactor operation would have no incremental effect (p. 2-5). Is this true or is this statement made in the same spirit as the "no significant impact" due to the restart of the L-Reactor, which was rejected by all three branches of our government? The details necessary to decide are lacking.)	
BT-7	The Draft EIS is also insufficient because it is contradictory. Examples: The Draft claims (page S-5) that the withdrawal of water for SRP will not affect the availability of water for offsite users. But data presented later (e.g., page 3-28) clearly indicate the growth of a cone of depression in the aquifers under SRP. Savannah has a cone of depression and citizens are well aware that the cone of depression affects the availability of water.	Every pumping well, onsite or offsite, has a local cone of depression. At SRP, these local cones for wells pumping from the Tuscaloosa Aquifer might reach depths of about 12 meters. However, the cones at SRP diminish in depression very rapidly with distance from the pumping wells (Section F.4.3); they are reduced to very small levels before reaching the nearest offsite consumers of Tuscaloosa ground water. As noted in this EIS, the ground-water flux flowing through the Tuscaloosa Formation at and near the Savannah River Plant (Sections F.3.1 and F.4.2) has been conservatively calculated to be 51 cubic meters per minute (Section F.4.2). The total pumpage rate for this area in 1989, including the withdrawal for L-Reactor operation, the FMF and DWPF would be about 37.9 cubic meters per minute (Section 5.2.3). The expected ground-water usage in the area will not exceed available inflow in the foreseeable future. Thus, the SRP usage is unlikely to appreciably affect water levels in offsite Tuscaloosa wells. The declines in water levels in Tuscaloosa monitoring wells are related primarily to increased pumping at SRP, although some of these declines are apparently associated with reduced winter precipitation. Because pumping rates at SRP are expected to be relatively stable over the next six years (23.8 cubic meters per second in 1982, compared to 25.4 and 26.4 cubic meters per second projected for 1985 and 1989, respectively (Section 5.1.1.4 and 5.2.3)) the declines in water levels in the Tuscaloosa Aquifer at SRP are expected to be arrested. As pumping rates change at SRP, new equilibrium piezometric surfaces will develop very rapidly; near equilibrium levels are expected to occur in about 100 days. Thus, pumping at SRP does not appear to have been depleting the aquifer.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		Ground-water withdrawal due to L-Reactor restart, including incremental pumping by support facilities and other SRP facilities, is expected to decrease the water levels in municipal wells at Jackson and Talatha below 1982 levels by 0.4 and 0.1 meter respectively. These projected declines are about one-half the water level fluctuations in Tuscaloosa wells that were observed in 1973 due to increases in winter precipitation. Long-term cyclic changes in Tuscaloosa Aquifer water levels of 2 meters have been observed in wells near SRP (Section F.2.3.2).
BT-8	Likewise, the Draft EIS claims (p. 4-4) that safety considerations override production considerations. Yet, on page S-9, safety system alternatives are rejected because their application will not allow production schedules to be met.	The safety system mitigation alternatives identified in the EIS are for the mitigation of potential consequences from hypothetical reactor accidents, which have a very low estimated probability of occurrence and associated risk. Based on benefit, cost, and technical feasibility, this final EIS has identified the reference case confinement system as the preferred safety system alternative.
BT-9	The Draft EIS is insufficient because it does not contain adequate data. Examples: the impact of a major accident on water quality downstream is not adequately described.	The impact of potential accidents is discussed in Section 4.2. of the EIS.
BT-10	Nor are the operating details of the Reactor Safety Advisory Committee. Who are they? Are they independent or are they toadies of DOE? What authorities do they have?	The Reactor Safety Advisory Committee is comprised of two members of the corporate management of E. I. du Pont de Nemours and Company from the Wilmington, Delaware, offices, two members of the management of the Savannah River Laboratory who are not directly responsible for SRP reactor operations, and three independent consultants who are knowledgeable in the field of nuclear reactor safety. The committee meets several times a year to advise du Pont management on policies and practices related to the safety of SRP reactor operations.
BT-11	The Draft EIS is inadequate because it makes assertions and reaches conclusions without adequate justification. Examples: the adequacy of protection of the public from transportation accidents (p. 4-68) is asserted but without sufficient detail to justify the conclusion.	Section 4.3.1 of the EIS discusses the transportation of material to and from the L-Area, and to and from the SRP site as a result of L-Reactor operation. Safety of the public is ensured through attention to (1) containment of radioactive material, (2) control of radiation loads, (3) prevention of criticality, and (4) protection against theft or sabotage. Criteria vary according to the material being shipped and are covered in the appropriate Department of Transportation, NRC and DOE regulations. Also see the response to comment AY-10 regarding transportation of radioactive materials.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BT-12	Details of the cost and time requirements for building cooling towers are not presented.	The EIS in Section 4.4.2 provides data with respect to costs and implementation schedules for all cooling-water mitigation alternatives considered. The cost and schedule data presented are the best estimates currently available.
BT-13	The Draft EIS is inadequate because it does not consider all the prudent and logical alternatives. Examples: the alternative sources of production has already been mentioned.	Alternative sources of weapons grade plutonium are assessed in Section 2.1 of this EIS. As discussed in this section, no production options or combinations of options can provide the needed defense nuclear materials in the near-term time frame. See also the response to comment BL-15 regarding the L-Reactor restart and partial production options.
BT-14	Alternative oversight mechanisms and authorities are not identified or discussed.	See the response to comment BQ-2 regarding existing oversight mechanisms.
BT-15	These and other inadequacies of the Draft EIS clearly indicate to us that DOE has not done its job. Perhaps things would be different if DOE believed in the legitimacy of the EIS process instead of having to be dragged into it kicking and screaming by Congress, the Administration and the Courts.	DOE has prepared this EIS in compliance with the requirements of the Energy and Water Development Appropriations Act, 1984, and the National Environmental Policy Act of 1969, as amended.
* BT-16	What would we like to see in the Final EIS? In addition to the correction of the above-mentioned deficiencies, we would recommend the following commitments be adopted by DOE. (1) Accelerate production from other alternative sources, assuming that the environmental risks are negligible. (2) Defer the restart of the L-Reactor until such time as the following can be implemented: (i) construction of a cooling water alternative such as cooling towers that would eliminate scalding water discharge into Steel Creek and the numerous environmental impacts that such a discharge creates. (ii) Increase the level of containment at the L-Reactor, especially to provide containment for radioactive gases that can currently escape unaffected by existing controls.	See the response to comment BM-1 regarding the Department of Energy's Record of Decision on this EIS. All of the commitments suggested will be considered by the decisionmaker in arriving at the Record of Decision. Sufficient information on environmental impacts of the alternatives and options is provided in this EIS to enable the decisionmakers to make a reasoned decision. Also see the responses to comments AB-2 and BL-15 regarding need and production options, the response to comment AA-1 regarding cooling water mitigation alternatives, the response to comment BF-7 regarding containment, and the response to comment BQ-2 regarding existing oversight mechanisms.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	(iii) accelerate the closure of all the seepage basins and provide alternative treatment for the L-Reactor waste, so as to avoid further contamination of the ground water and (iv) establish an Independent oversight group consisting of Federal, State and citizen representatives who would work to insure that both the L-Reactor and SRP as a whole would operate in the safest and most environmentally benign method possible.	
BT-17	In conclusion, let me state some of our disappointments. We are disappointed in the inadequacy of the Draft EIS. The present one is not adequate to make wise judgments. We are disappointed in the continuation of the double standard for the L-Reactor. Safety and environmental control standards for the commercial nuclear power industry are not required for the government's L-Reactor. This is especially ironic when one realizes that plans for a new production reactor include cooling towers and a containment dome, but the ancient L-Reactor is deemed not to need them.	See the responses to comments AF-1 and BF-7 regarding differences between SRP and commercial nuclear reactors
BT-18	We are disappointed in the continued desire of DOE to restart the L-Reactor right away when other alternatives appear to be available. And finally, we are disappointed that DOE has not participated in the EIS process in good faith. Many citizens with many different viewpoints have participated in good faith. Is it too much to ask that our government, as represented by DOE, do the same? We do not seek to delay for the sake of delay. We seek delay only until such time as needed safety and environmental quality controls can be implemented. Thank you.	See the response to comment BT-13 regarding production alternatives.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	SAVANNAH AREA CHAMBER OF COMMERCE "We Mean Business" 301 West Broad Street Savannah, Georgia 31499 (912) 233-3067 STATEMENT FOR THE DEPARTMENT OF ENERGY PUBLIC HEARING ON DRAFT ENVIRONMENTAL IMPACT STATEMENT ON REACTIVATION OF L-REACTOR OF SAVANNAH RIVER PLANT BY KEN MATTHEWS for SAVANNAH AREA CHAMBER OF COMMERCE November 4, 1983 I am Ken Matthews, a member of the Natural Resources and Energy Management Committee of the Savannah Area Chamber of Commerce. On behalf of our organization, I want to thank you for this opportunity to react to the Draft Environmental Impact Statement prepared by the Department of Energy for the proposed restart of the L-Reactor at the Savannah River Plant near Aiken, South Carolina. As we have told you on previous occasions, we have grave concerns over the Department of Energy's plans for the reactivation and expansion of facilities of the Savannah River Plant. As lay people, however, we feel that we may be unable to adequately evaluate the detailed scientific and technical information contained in the draft Environmental Impact Statement.	In accordance with the requirements of the Council on Environmental Quality DOE has attempted to make this EIS as readable as possible for the lay reader, given the technical complexity of the subject. In addition, the Summary has been revised specifically to be readable by the lay public.
BU-1		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BU-2	Clearly, an independent, credible analysis is needed to allay our concerns. As you will recall, these concerns centered around the cumulative effects of the present and proposed facilities of the Savannah River Plant as well as those of contiguous operations such as Georgia Power Company's Plant Vogtle and the Allied General Nuclear Processing Facility in Barnwell, South Carolina.	Section 5.2 of the EIS describes the cumulative effects of present and proposed SRP facilities and those of other nuclear operations in the vicinity of SRP.
BU-3	We are also concerned about the effective control of radioactive substances in the existing facility as they might affect the quality of groundwater, riverwater, and the air.	Releases of radioactive materials from L-Reactor and its support facilities are described in Sections 4.1 and 5.1 of this EIS. Releases from the entire Savannah River Plant are controlled to the extent practicable. Materials that are released have a very small radiological impact on the offsite population. The amounts of releases and their radiological impacts on the population within an 80-kilometer radius and on downstream consumers of Savannah River water are published in an annual series of reports available to the public, entitled: <u>Environmental Monitoring in the Vicinity of the Savannah River Plant</u> . The most recent of these reports, for 1982, is DOE document DPSPU-83-30-1.
BU-4	We have therefore asked that the Georgia Environmental Protection Division and the federal Nuclear Regulatory Commission be requested to review the draft Environmental Impact Statement. We feel that these organizations have the technical expertise and political independence to make an informed evaluation of the EIS that could be accepted by lay people as well as political leadership. Until these agencies have had the opportunity to conduct the independent analysis of the EIS that we have proposed to allay our concerns, we would ask that the reactivation of the L-Reactor be delayed. Once again, we appreciate this opportunity to express our views and assure you that we recognize and fully support the interests of the United States with regards to national defense. However, we ask that the nuclear development in and around the Savannah River Plant not be expanded further without a very thoughtful, independent analysis of the issues that have been raised and their potential effects on the communities and people of the Savannah River Basin.	The Georgia Department of Natural Resources, the South Carolina Department of Health and Environmental Control, the Nuclear Regulatory Commission, and other Georgia, South Carolina, and Federal agencies received copies of the EIS. As required by the Energy and Water Development Appropriations Act, 1984, the EIS was developed in consultation with the States of Georgia and South Carolina. DOE provided working drafts of the EIS to the states, met with their representatives, and incorporated their comments into the EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF		
SISTER CHARLENE WALSH, R.S.M. 207 E. Liberty St. Savannah, GA		
DRAFT ENVIRONMENTAL IMPACT STATEMENT, L-REACTOR OPERATION, SAVANNAH RIVER PLANT November 4, 1983		
I would like to make two comments under the heading: Health and Safety.		
In the DRAFT ENVIRONMENTAL IMPACT STATEMENT, L-REACTOR OPERATION, SAVANNAH RIVER PLANT-Vol. 1, September, 1983, there is a twelve (12) page section devoted specifically to STUDIES AND MONITORING PROGRAMS connected with the Savannah River Plant.		
Here are listed hundreds of monitoring sites and programs for tracing the radionuclide content of air, water from five streams that flow to the Savannah River, ground water, soil, grass samples, other vegetation, milk, food, drinking water for Port Wentworth and two South Carolina counties, atmosphere, rainwater...		
Besides these hundreds of checks for radionuclide content, there are federal and state monitoring programs for harmful nonradiological materials in the air, surface water, aquatic organisms, and ground water.		
There is mention of ongoing studies relating to cooling-water intake and discharge, wetland effects, effects on fisheries, endangered species, and five archeological sites.		
All this and more to reassure us that we have Mother Nature well under control. I am not reassured! Why this great expenditure of money, time, and scientific expertise, I ask, unless the dangers to us are equally great?		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BV-1	One paragraph from this section of the Environmental Impact Statement stays in my heart and contributes to my opposition to the restart of the L-Reactor and to the SRP. The last paragraph on 6-8 refers to two studies being conducted on SRP workers--a morbidity and mortality study of radiation workers and a health effects study of plutonium workers. I quote: "Both ... are in the early data collection and validation phase. Because these are comprehensive studies, results will not be available for several years." When the studies are complete, the damage will have been done! Citizens of Georgia and South Carolina need only recall the reassurances given the citizens of Nevada, Utah, and Arizona, and the errors exposed by a subsequent Congressional Oversight Committee. I call for such an oversight committee to be assigned this project. My second point relates to Health and Safety also. It has to do with the daily health and safety of the poor. The plutonium produced by the restart of the L-Reactor will be used to carry out the Pentagon's plans for producing weapons with first strike capability. Billions of dollars will continue to be spent as the arms race continues! The virtue of patriotism causes me to challenge the restart of the L-Reactor with the words of the Pope and Catholic Bishops of the world at the Second Vatican Council: "The arms race is one of the greatest curses on the human race and the harm it inflicts upon the poor is more than can be endured."	At the levels of radiation exposure received by Savannah River Plant radiation workers, no detectable health effects are expected; this belief is based on studies by the National Academy of Sciences Committee on the Biological Effects of Ionizing Radiation (<u>The Effects on Populations of Exposures to Low Levels of Ionizing Radiation</u>, National Academy of Sciences, Washington, DC, 1980). However, to ensure that no unexpected health effects are overlooked, studies are under way of the morbidity and mortality of SRP workers and of health effects of plutonium workers. Appendix B of the EIS addresses the effects of low-level exposure to radiation. DOE has asked the Centers for Disease Control, Atlanta, Georgia, to convene a panel to review the SRP epidemiological studies. This panel, which includes epidemiologists from the health departments of Georgia and South Carolina, held its first meeting to review ongoing studies on October 25 and 26, 1983. DOE plans to continue the ongoing studies and to implement any additional studies recommended by the panel.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF CHARLES MILMINE, INDIVIDUAL		
	Good morning. I am here this morning to address this hearing because I feel it is the responsible thing for me to do. I am afraid that I do it with the feeling that the DOE will little note nor long remember what I and some others will try to contribute to the decision-making process.	
	I address you again with a feeling of inadequacy. I make no claim to being a nuclear physicist. That is not to say that I do not seek better understandings and truth in this area.	
	Education and communication are two of my interests. As one vitally interested in the decisions you make, I am perhaps as interested in the decision process as I am in the decisions themselves.	
	We live in a time of great technological change. Quite often decisions regarding the use of this technology are made by men and women like yourselves who have been entrusted with the authority, whether by political design or political default.	
	The assumption of this authority carries with it the assumption of implied power. It is the arrogant display of this power that promotes my interest in the environmental consequences of the restart of the L-Reactor. I am still of the belief that our government is instituted among men deriving its power from the consent of the governed. I am concerned that as a result of our actions and inactions we may become a government of technocrats, by technocrats and for the people.	
	I find that I must repeat my request for a genuine effort on your part to reach the technologically disenfranchised. The citizens who are not here because they have little comprehension of the start up of the L-Reactor are the critical mass I wish you would concern yourselves with.	
	I am not suggesting that you continue to passively respond to requests for information. I maintain that most citizens are	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BW-1	either too intimidated by that process or just don't know how to formulate a question. I would like to see an active educational effort using existing facilities, such as science centers, schools and public television. The objective of your educational efforts would be to achieve a critical mass of people that is capable of asking intelligent questions and providing constructive suggestions. I feel that this educational effort has to be a positive one. Sitting back and answering requests for information is certainly the path of least resistance. However, it is bound to lead to frustration within the critical mass and the result could be counterproductive from your point of view. I wonder if the return on your investment would not be greater on an active education program than on the passive investment in education you are now making.	To the extent practicable, due to cost and security, DOE has attempted to distribute information to the public about the activities of the Savannah River Plant. During the last 6 years, DOE has published four EISs and two EAs with numerous references that are publicly available, as well as many studies by the Savannah River Ecology Laboratory and the Savannah River Laboratory.
BW-2	To avoid the criticism you fear from people who think you are "promoting nuclear energy and promoting nuclear matters," whatever they are, I repeat my suggestion for the formation of a citizen's committee given the responsibility of overseeing the educational effort.	See the response to comment BQ-2 regarding existing oversight mechanisms.
BW-3	I also believe that this or another citizen committee should be involved in reviewing your environmental monitoring program. I see too much in-house or closely-controlled monitoring proposed. I also see the names of a select few outside organizations doing repetitive monitoring. I understand that some of the data from the monitoring find their way into scientific journals where sampling techniques and results are scrutinized. I am more concerned about those data that do not make it to the journals for, perhaps, national security reasons. I am also concerned that the monitoring of the citizens (health, etc.) is not done on a regular scientific basis. You have said that you did not think it was a wise use of the taxpayers' money to have one government agency review the work of another. One person commented here back in May that she did not mind her money being used for that purpose, and I concur.	The States of South Carolina and Georgia and the EPA conduct monitoring in the vicinity of the SRP. The results of their monitoring are consistent with SRP data. Section 5.2 describes cumulative effects from SRP facilities and other plants within the immediate vicinity of SRP. All documents referenced in this EIS are available for public review in the DOE public reading rooms in Aiken, South Carolina, and Washington, D.C. Also see the response to comment BW-1 and the response to comment AB-2 regarding disclosure of classified information. DOE will comply with all applicable Federal and state regulations on environmental protection. DOE is committed to consider, evaluate, and implement measures to improve safety and health protection at SRP; this includes long-term

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	I always thought that a system of checks and balances was a good idea in our government.	epidemiological studies that currently are being evaluated by the Centers for Disease Control, Atlanta.
		Also see the response to comment BQ-2 regarding existing oversight mechanisms.
BW-4	I wonder if the citizen's committee could not assist in reviewing the data from the monitoring program. I'm talking about reviewing field sampling techniques and interpretation of data. I notice, for instance, that you say that the Environmental Assessment listed a figure of 46 curies of cesium that would be washed out of Steel Creek in the first 14 years of operation. Now, improved estimates indicate there would be on the order of 14 curies. I would like to know why the estimate was changed. I would also like to know how and why the estimate was changed. I would feel better that there will not be similar changes in estimates in the future. I would just feel better if an independent reviewing authority was involved.	See Section D.4.3 of the EIS.
BW-5	In sum, I remain concerned about the critical mass of people who are not here today. I have two constructive suggestions to remedy the situation. One: Embark on an active and balanced educational effort aimed at involving more intelligent people in the decisions you are entrusted to make. Two: I repeat my suggestion of a citizen's committee with oversight responsibilities for some of your operations with the objective of lending credibility to your decisions.	See the response to comment BW-1 regarding publicly available information and the response to comment BQ-2 regarding independent monitoring by the States of South Carolina and Georgia.

Respectfully Submitted,

Charles E. Milmine

2427 Easy St.
Savannah, GA 31406-4229
(912) 355-5522

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
M-190		
STATEMENT BY		
JAMES D. HOWARD		
P.O. Box 13687		
Savannah, Georgia 31416		
4 November 1983		
Concerning The		
L-Reactor Environmental Impact Statement		
I am deeply troubled as are many others in coastal Georgia with the operations at the Savannah River Plant (SRP). Although I am speaking in response to immediate concerns about the restart of the "L" reactor, this also relates to the overall SRP operation.		
BX-1	I do not believe the present modus operandi of SRP is as safe an operation as it easily could be. Specifically, I believe the L-reactor and all other reactors should be retrofitted with containment domes and cooling towers and an adequate permanent waste storage facility. You of the Department of Energy (DOE) claim the towers and domes are not needed because of the size and type of reactors at SRP. However, we both know that if any agency other than the federal government put a reactor in operation they would be forced to take these safety precautions. Surely if it is necessary to have a multi-billion dollar defense budget, part of which will create more nuclear weapons material and associated high-level nuclear wastes, it is reasonable to expect that the production of that material be done in the safest way possible.	See the responses to comments AA-1 and AB-13 regarding information provided in the EIS on cooling-water mitigation alternatives, the response to comment BA-5 regarding high-level radioactive waste, and the response to comment BF-7 regarding differences between SRP and commercial nuclear reactors.
BX-2	A second point that concerns me is the propensity of your agency (DOE) and its predecessor organization (AEC and ERDA) for not telling the truth to the American people. In the case of the SRP operation you claim the operation is safe and clean but there is very little in your past history to justify believing you can be trusted to tell the truth or to believe	See the response to comment BQ-2 regarding independent monitoring.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	that you will not mislead us if it is more convenient. For this reason I believe there should be an independent oversight committee established to oversee and monitor the present and future operations of the SRP.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Statement of the League of Women Voters of Georgia at the Public Regional Review of DRAFT ENVIRONMENTAL IMPACT STATEMENT L-REACTOR OPERATION, SAVANNAH RIVER PLANT AIKEN, S.C. Held at the DeSoto Hilton Hotel Savannah, Ga. November 4, 1983 9:00 a.m. and 6:00 p.m. GENTLEMEN: <u>Introduction of myself</u> I am Geraldine LeMay, chairman of the Natural Resources Committee of the League of Women Voters of Savannah-Chatham County and formerly chairman of the Energy Committee of the League of Women Voters of Georgia. Mrs. Lee Wash, president of the Georgia League, has asked me to represent her in speaking for the state League at this hearing. Care for the environment is a major concern of the League, and the League of Women Voters of the U.S. In its policy toward energy development and implementation takes the position that "environmental protection is a primary consideration." <u>My previous appearances at Savannah River Plant hearings</u> This is my fourth time to represent the Georgia League of Women Voters at a public hearing on the proposed reactivation of the L-Reactor at the Savannah River Plant. My earlier comments were concerned with the need for an Environmental Impact Statement (EIS) and recommendations on the process of its development and desirable goals for the EIS. Today I am pleased that the draft EIS has now been issued. I have some comments on its findings.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>Comments on the findings of the DEIS</u>		
1. Need for the operation of the L-Reactor		
BY-1	The report provides very little information related to the need for the operation of L-Reactor at this time. Statements regarding the need to produce more plutonium are based on classified information contained in Appendix A, which is not available to the general public, so no definite substantiation of need is provided by the DEIS.	See the response to comment AB-2 regarding information on need for defense nuclear materials in the EIS and the information available to decisionmakers.
2. Production alternatives		
BY-2	The study of production alternatives was not adequate. The draft did not even consider such an alternative as speeding up the recovery of obsolete warheads, a proposal advanced by Sen. Nunn and Rep. Thomas and approved by President Reagan. Recovery of plutonium from commercial power reactor spent fuel also was not considered as a viable alternative because of timing considerations and legislation prohibiting such use of fuel produced in commercial reactors. These alternatives deserve consideration since they might help to alleviate two problems connected with the nuclear energy program, by 1) increasing the supply of weapons grade materials and 2) reducing the size of the nuclear waste now in storage.	The conversion of spent commercial reactor fuel into weapons-grade plutonium is currently prohibited by law (Atomic Energy Act of 1954, as amended, 42 USC Section 2077(e)(1). Legislative removal of this prohibition is not considered a reasonable alternative to the restart of L-Reactor as a source of weapons-grade plutonium. This policy determination was passed by Congress in December 1982 which reaffirmed the position of strict separation of nuclear defense and commercial activities established by the Atomic Energy Act in 1954. Moreover, when the House of Representatives was specifically asked in December 1982 to reject the prohibition drafted by the Senate, the House overwhelmingly refused to do so by a vote of 281 to 107 (U.S. Cong. Rec., Volume 128, pages H8816-8817, December 2, 1982). The anticipation that such a strong and recent statement of policy would be reversed in the near future is unreasonable. The recovery of material from retired warheads is included in the annual Nuclear Weapons Stockpile Memorandum. Additional information on production options has been added to Sections 1.1 and 2.1 of this EIS.
3. Water pollution at the SRP		
BY-3	The DOE states that organic solvents have seeped from chemical settling basins at the SRP and have contaminated groundwater supplies at the plant and that traces of the contaminants have also been found in the Tuscaloosa Aquifer, a major source of drinking water for Georgia and South Carolina. The Senate, with Senator Thurmond as principal sponsor, has ordered the expenditure of funds to clean up the pollution, to phase out some	See the responses to comments AJ-1 and BG-4 regarding the use of seepage basins and DOE commitments for ground-water protection.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	seepage basins now in use and to build a new treatment plant properly to process waste water, this to be done within twenty-four months of the final approval of the project. In line with this directive, if it is decided to place the L-Reactor back in operation, the DOE, with proper concern for the health of the people of the area, should delay its start-up, with the added volume of waste water this will bring, until after the waste water treatment plant is operable and the use of seepage basins is reduced.	
	4. Public safety and environmental protection	
BY-4	The DOE is required by law to consider seriously all options to minimize damage to the public health and to the environment. To this end it has been suggested that cooling towers and a containment dome should be built at L-Reactor, and Senator Mattingly earlier expressed concern about an L-Reactor without such safety features. The draft EIS dismisses such suggested alternatives, saying either they will not allow DOE to meet production schedules or that they are too costly. Congress has, however, shown by its action on the wastewater treatment plant that it considers justifiable the expenditure of funds to enhance public safety and environmental protection.	The EIS presents the analyses for all mitigation alternatives, including cooling and safety systems, in Sections 4.4.1 and 4.4.2 of the EIS. Also see the responses to comments AA-1 and AB-13 regarding information contained in this EIS on cooling-water mitigation alternatives, the response to comment BF-7 regarding a containment dome, and the response to BM-1 regarding the Department of Energy's Record of Decision on this EIS.
	<u>Requests for action</u>	
BY-5	1. To provide the protection which is due to all citizens in South Carolina and Georgia living in an area where air and water quality could be affected by the L-Reactor reactivation the DOE facilities should be required to meet the federal and state environmental standards which apply to commercial reactors.	See the responses to comments AA-3, and BF-7 regarding DOE's commitment to comply with applicable federal and state regulations and the differences between SRP reactors and commercial light-water reactors.
BY-6	2. If the final decision is to reactivate L-Reactor, before start-up all feasible steps to avoid damage to the environment should be taken.	See the responses to comments AA-1 and AA-3 regarding cooling-water alternatives and DOE's commitment to comply with applicable federal and state environmental protection regulations.
BY-7	3. To avoid the criticism or the actuality of a biased approach DOE should establish an independent oversight committee in line with the recommendations made by the plaintiffs in a lawsuit about the EIS. Such a committee would oversee studies and mitigation measures. The need for such a committee is made	See the response to comment BQ-2 regarding independent monitoring by the States of South Carolina and Georgia, and the response to comment AB-20 regarding the opinion of the U.S. District Court and the preparation of the <u>Finding of No Significant Impact</u> .

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	especially desirable because the DOE used for the preparation of the DEIS the same company which conducted the earlier environmental assessment, whose conclusion of no significant impact from the reactivation of the L-Reactor was termed by U.S. District Judge Thomas P. Jackson "unreasonable" and an "abuse of discretion." <u>My conclusion</u>	
BY-8	If the EIS does point to the likelihood of serious harm to people and to the physical environment, the L-Reactor should not be put back into operation. The health and safety of the people who live and work in the area should be accepted as infinitely more valuable than the millions of dollars invested in an idle nuclear reactor. The L-Reactor should not again be placed in operation if doing so will lower the quality of life for the people who live in its immediate area in South Carolina and Georgia and along the Savannah River below the plant site. Geraldine LeMay	See the response to comment BM-1 regarding the Department of Energy's Record of Decision on this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BZ-1	Statement of Virginia Brown, citizen, before the Department of Energy at a Public Hearing at Savannah, Georgia, November 4, 1983, on the Environmental Impact Statement regarding the restart of the L-Reactor at the Savannah River Plant, Aiken, South Carolina.	The purpose of the Environmental Impact Statement is to analyze the environmental consequences of the proposed restart of L-Reactor in accordance with the Energy and Water Development Appropriations Act, 1984, and the National Environmental Policy Act (NEPA) of 1969, as amended.
	I am not reassured by the message in the recently released EIS on the reactivation of the L-Reactor. It seems to me to accept the fact that reactivation will damage the surrounding environment; to send the message that little can be done about it; and to say that, even if something could be done, nothing will be.	DOE will prepare its Record of Decision based on the EIS and on other studies on the need for defense nuclear materials. DOE will consider all alternatives in reaching its decision, including environmentally preferable alternatives and preferences for alternatives based on the technical, economic, and statutory mission of the agency; DOE will also determine whether all practicable means to avoid environmental effects from the selected alternative have been adopted. DOE will comply with all applicable Federal and state regulations on environmental protection.
	Recently, I read, in the Christian Science Monitor, a page and half of interview¹ with a modern American farmer. Better than I can, myself, his words express my consternation with the drift of philosophy that is evidencing itself in recent years among certain segments of United States society.	
	NOTE 1: Letters from an American farmer, 1983, Wendell Berry, Port Royal, KY, to Christian Science Monitor staff writer, Robert Marquand, Jr.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
BZ-2	This farmer was assessing the impact that an energy producing plant would have on his locality. He said, in part, "(The people who are in charge of the plant) activities do not live here and so do not have to worry about its safety. Their indifference to its impact, and their indifference to its safety has been a matter of public record from the beginning. "Safe use of any technology should be personally guaranteed by the members of the board of trustees and directors--that is, they should be personally liable to prosecution if their guarantees fail. "(The fact) that dangerous power--nuclear and otherwise--can be used without such guarantees not only constitutes an intolerable threat to public health and welfare, but is a kind of technological politics that is totalitarian in implication. "Free enterprise is defensible only when used by people wholeheartedly committed to the welfare of their neighbors, neighbors being any who live within reach of the consequences of one's acts. The interest of neighbors should take precedence over the interests of stockholders, business partners and allies, preferred customers, etc. One of the duties of our government, as constituted, is to assure that precedence."	The Savannah River Plant is owned by the U.S. Government and operated by Du Pont without fee. Ninety-seven percent of the SRP employees, including DOE and Du Pont management personnel reside in the 13 counties surrounding the Plant. Safety and environmental factors are major components of operating the SRP. The SRP is operated in the safest possible manner with releases controlled to as low as reasonably achievable levels that are well within applicable standards. The owners/operators understand the responsibility for safety and prudent operation of the SRP.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
M-198	THE LEAGUE OF WOMEN VOTERS OF SAVANNAH-CHATHAM 321 E. York St. Savannah, Georgia 31401	
	STATEMENT BEFORE THE DEPARTMENT OF ENERGY AT A PUBLIC HEARING AT SAVANNAH, GEORGIA, NOVEMBER 4, 1983, ON THE ENVIRONMENTAL IMPACT STATEMENT REGARDING THE RESTART OF THE L-REACTOR AT THE SAVANNAH RIVER PLANT, AIKEN, SOUTH CAROLINA	
	I am Virginia Brown, member of the Environmental Quality Com- mittee of the League of Women Voters of Savannah-Chatham.	
	The League of Women Voters "believes that government should be responsive to the will of the people...allowing them to share in the solution of...problems which affect the general welfare."	
CA-1	The Savannah-Chatham League believes that, in the case of the Savannah River Plant, the original decision to build this plant in our area was not made locally; that the decision was made without the participation of those who would be directly affected environmentally. That lack of citizen input on decision-making should not continue, the League believes. Further development of the plant, such as reactivation of the L-Reactor should only be accomplished after local people have shared in that decision.	Any decision to operate L-Reactor will be made in accordance with the provisions of the National Environmental Policy Act including those which involve public participation.
CA-2	The League also wonders if the manufacture of additional nuclear fuel for weapons of war is conducive to the promotion of world peace to which principle the League is committed.	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.
CA-3	In April of 1982, a national public opinion poll reported that 58 percent of the sample surveyed agreed with this statement: "Protecting the environment is so important that requirements and standards cannot be too high, and continuing environmental improvements must be made regardless of cost."	The Department of Energy will consider all factors--cost, schedule, environmental impacts including health and safety, national security, and DOE's statutory mission in formulating its Record of Decision.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
CA-4	The League urges decision makers to heed this expression of concern. The League of Women Voters believes that "special attention must be given to solving waste disposal problems associated with nuclear energy sources."¹ We are concerned about the "waste" that is to come out of the plant as heat in water discharges to pollute nearby streams; the "waste" that comes out of the plant of both chemical and radioactive discharges to pollute the air and water; and the "waste" that comes out as radioactive solids with no proved, safe storage techniques to keep it from eventually polluting the environment. To lessen the impacts of the above listed environmental impacts, the League supports the use of adequate safeguards including containment of air and water pollution; cooling of discharged hot water before being channeled into the natural water courses; and, delaying of the restart until some reliable, safe way is found to store nuclear wastes.	The impacts of nonradiological and radiological releases from L-Reactor are described in detail in Sections 4.1.1 and 4.1.2 of the EIS. The "wastes," in the form of heat in water discharges and chemical and radioactive discharges, are regulated by state and Federal permits. As noted in Section 5.1.2.8, the volume of high-level radioactive waste to be generated by chemical processing of L-Reactor material was considered in the EIS for the Defense Waste Processing Facility (DOE, 1982). DOE will comply with all applicable state and Federal regulations on environmental protection. Also see the response to comment AV-2 regarding high-level radioactive waste.
¹IMPACT ON ISSUES, 1982-1984, the League of Women Voters of the United States, copyrighted 1982.		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF WOLFGANG BENGTTSSON		
	The Savannah River Plant doesn't have to restart L-Reactor operations. My reasons for this statement are:	
CB-1	The plutonium produced during L-Reactor operations is supposed to be used as nuclear explosive in mostly middle range Euro-missiles. To me the resumption of L-Reactor operations means an intimidating attempt during the still lasting Geneva negotiations. It anticipates a failure in those negotiations between the United States of America and the USSR. The responsible party for the restart of the L-Reactor, currently the Reagan administration, seems to prepare a build up of nuclear warheads to hasten the deployment of missiles in case of a failure of the US-USSR-negotiations on Euromissiles. This might--in my opinion--harden the position of the Russian party and goad them to prepare similar action to produce more warheads. This path is well known as a part of the so called arms race and might well precipitate an evitable disaster.	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.
CB-2	Even after a temporal failure in Geneva in serious and genuine negotiations there is no need, in my opinion, to restart L-Reactor operation. By the way, from my point of view, there is neither a sign of failure nor one of genuine negotiations at Geneva. But nuclear material might be gained by reworking discarded warheads and reprocessing the aged nuclear explosives. Reprocessing nuclear waste of working nuclear power plants will give an additional amount of plutonium. From my knowledge all the requirements to match this scenario are fulfilled. Therefore enough nuclear explosives for truly necessary missiles are available without restarting a very special plutonium producing reactor.	See the responses to comments BL-19 and BY-2 regarding utilization of material from retired weapons and commercial reactors.
CB-3	Another factor might provide against the L-Reactor's restart. The more "fresh" plutonium is produced for nuclear warheads the more aged material due to the radioactive decay has to be taken care of. Care in this case means storage over centuries. But there is no secure storage possibility. Even after glassification--which by now is still in a process of research and approval and has led to no reassuring results--the radioactive waste still produces heat and, thus, is able to change geological properties of the storage site. Storage in water basins or	The plutonium from retired weapons systems is routinely reused in new weapons systems. As described in Section 5.1.2.8 of the EIS, the high-level radioactive wastes associated with L-Reactor operation will be stored temporarily in existing multibarrier waste tanks at the Savannah River Plant. The concentration of fissionable material in SRP waste is below that required to produce a critical mass. Beginning in 1990, this waste will be solidified into

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	artificial pools is not a secure possibility, either. This is obvious because of its dependence on stirring and cooling which again may fail related to electrical and other problems. If the cooling and stirring system or either of them fails to work properly, the critical mass of radionuclides is readily achieved. All this leads to my opinion that a restart of L-Reactor operations in general and especially at this very crucial period of this century is unnecessary and might even be disastrous.	borosilicate glass waste forms in the Defense Waste Processing Facility. The engineering design and assessment for the waste forms and for the DWPF are essentially complete; groundbreaking for the DWPF was held on November 8, 1983. The borosilicate glass waste forms will be placed in temporary storage onsite and then placed in a deep-mined Federal geologic repository. Heat production from the relatively dilute SRP high-level wastes is quite low, about 100 to 500 watts for each ton-and-a-half DWPF borosilicate glass waste canister.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF WIEBKE BENGTTSSON		
	I am worried about the environmental aspects and the affection on public health, that a restart of the L-Reactor would have. Moreover I am very concerned about the emergency plans which will come into action after a reactor accident.	
CC-1	A high radiocaesium concentration in surface sediments of the Steel Creek down to the delta are reported in the EIS (>10 pCurie per square meter). At the Savannah River, sediments have essentially higher concentration of radiocesium downstream of the SRP than upstream. It is not very reasonable to believe that the concentration will drop with the resumption of L-Reactor operations. In natural habitats there is an enrichment of radionuclides in plants and animals as passing along the food chain. As a mother of a three month old baby I am worried about the effects of radioactive nutrition on my children and on their children. Our knowledge about the critical level of radionuclides in food equals almost zero, but we know that nuclear radiation has a powerful impact on lethal and sublethal mutations in animals. Moreover the authors of the EIS admit that the radiation released from SRP at normal operation without a working L-Reactor is more than double the amount of all other nuclear facilities. After a restart of the L-Reactor the level of radiation is not likely to decrease. Although this is so-called low level radiation there is no proof that this radiation is not dangerous. In the very few research studies on this subject there is an indication, that long term exposure to low level radiation affects the genotype of animals. The alteration in chromosomal appearance and behavior during cell division may occur not until the first generation after the exposure. In a situation when we do not know if low level radiation.....another low radiation source.	Bioaccumulation is discussed in Appendixes B and D and is also taken into account in the dose calculations presented in Section B.3. According to the practice of the Nuclear Regulatory Commission, infants are assumed to eat small amounts of fish and should receive a negligible dose from this pathway.
CC-2		See the response to comment BF-6 regarding radiation protection standards and the estimated maximum annual health effects associated with L-Reactor and its support facilities.
CC-3	I think there is still another very important reason to--at least--postpone the restart of the L-Reactor. What I learned from EIS about the emergency plans which come into action after a reactor's failure is that they are classified or at least not easy to get for the public. In case of an accident people will panic if they do not know the proper emergency plan. If there should be the need of an evacuation authorities might not be	All emergency plans developed for offsite responses to SRP incidents are readily available from cognizant Federal, state, and local agencies. Federal plans encompassing the responsibilities of the Federal Emergency Management Agency, the Inter-agency Radiological Assistance Plan, and Emergency Management Plans for the Department of Energy can be obtained from the DOE Savannah River Operations Office. State general and

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	able to handle the throng. According to the EIS there is only one hospital where the personnel might be able to deal with radioactive decontamination.	site-specific plans for the SRP can be obtained from the Georgia Emergency Management Agency or the South Carolina Emergency Preparedness Division. County plans can be obtained from each county emergency preparedness director. None of these plans is classified. Persons residing within the emergency planning zones will be informed of the planning for responses to radiological emergencies in their areas. Workshops will be conducted to delineate responsibilities and appropriate actions to be taken. Each plan will include the identification of services available, including decontamination, first aid, shelters, hospitals, and security. Agreements with and training for organizations providing special services are part of the plans. Several hospitals in the SRP area are capable of handling contaminated patients.
CC-4	But I want to stress the fact that there is no possibility of dealing with radiation diseases. There is no cure from exposure to radiation in case of an SRP-accident. How are people supposed to be treated who have a radiation disease? They should know it. But by now there are almost no information about that according to the EIS.	No acute offsite effects should result from either routine operation of L-Reactor or hypothetical accidents. See Section 6.3.3.1 of the EIS.
CC-5	The public should have full access to all emergency and evacuation plans. As long there is no full information about those plans the restart of the L-Reactor should be put off. ... and how a possible accident may affect their personal health.	See the responses to comments AY-11 and CC-3 regarding emergency response plans and where these can be obtained.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF WILLIAM McLAUGHLIN ON DRAFT ENVIRONMENTAL IMPACT STATEMENT L-REACTOR OPERATION DeSoto Hilton Hotel November 4, 1983		
	My name is William McLaughlin. I have presented testimony on the need for a complete and environmentally sound Environmental Impact Statement on the L-Reactor in Augusta, and here in Savannah. I congratulate the Department of Energy for its thoroughness in complying with the letter of the law. That law being the National Environmental Policy Act of 1969-NEPA. I continue to be impressed at the great amount of effort that has gone into the rebuttal of those speaking in favor of the Environmental Impact Statement, as well as those speaking in favor of specific Environmental Impact Statement recommendations.	
CD-1	But I am very frustrated and angry at what I perceive as a total violation and disregard for the spirit of this same law. I feel as if the Department of Energy has decided that the L-Reactor will re-commence operation as soon as humanly possible--with no real regard for its effects on the land and people of South Carolina and Georgia. All of the legitimate, public generated, environmental and health concerns have been negated and nullified on paper, in the Draft Environmental Impact Statement. I am sorry to inform this committee that it is not going to be that easy.	The Department of Energy has prepared the EIS to analyze the environmental impacts of the proposed restart of L-Reactor. Subjects for the scope of the EIS that were substantive and relevant to the proposed action were included in the EIS. Comments that were outside the scope of the EIS or not related to the NEPA process were not included. Also see the response to comment BM-1 regarding the preparation of the Department of Energy's Record of Decision on this EIS.
CD-2	The results and recommendations of the Environmental Assessment were not adequate. Neither are the results and recommendations of the Environmental Impact Statement, which are remarkably similar to the Environmental Assessment. Once again, I come before this committee. Now, however, I feel completely powerless and disenfranchised from the act of presenting any seriously considered environmental input into the proposed decision to restart the L-Reactor.	Many areas of discussion in the Environmental Assessment have been expanded in this EIS, including production alternatives and need, a delay of L-Reactor restart, current fisheries data, data for accident calculations, safety mitigation alternatives, and detailed data on cooling-water alternatives. DOE will base its decision on the restart of L-Reactor on the final EIS and on other studies on the need for defense nuclear materials. The decision process will consider the environmentally preferable alternatives and preferences for alternatives based on the technical, economic, and statutory missions of the agency.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
CD-3	With that in mind, I present the following, within the context only of the letter of the 1969 NEPA law. I feel that the environmental integrity of the ecology of SRP demands 1) cooling towers, 2) a containment dome, 3) proper waste storage facilities, and 4) an independent oversight committee of total SRP operations. The Department of Energy has not found any of these to be necessary for a safe startup. On that last point, an oversight committee, I would like to publicly offer myself as a potential member of that committee. Representative Lindsey Thomas first proposed this committee and I have personally made this same request of him. I shall be waiting to hear from both of you. We are all here to face up to a responsibility. A responsibility to ourselves and future generations. We must not allow the L-Reactor to commence operations without adequate safety precautions.	See the response to comment AA-1 regarding cooling water alternatives, the response to comment BF-7 regarding containment, the response to comment BA-5 regarding waste storage facilities, and the response to comment BQ-2 regarding existing oversight mechanisms.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MIRIAM LITCHFIELD		
CE-1	My name is Miriam Litchfield. I testified at the last hearing in Savannah concerning the Environmental Assessment of the L-Reactor startup. This evening I find myself having the same doubts, fears, and frustrations as I had last May. It seems little has changed. Yes, you did comply with the law and complete a draft Environmental Impact Statement, but what major changes did you make after hearing our concerns? You made no provisions for cooling towers, a containment dome, waste storage facilities, or an independent oversight committee. An Environmental Impact Statement is not just a formality made to appease concerned citizens. I congratulate you for finally submitting a draft Environmental Impact Statement, but wish I could also congratulate you for taking our concerns and making them a part of that statement.	See the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives, the response to comment BF-7 regarding containment, the response to comment BA-5 regarding waste storage facilities, and the response to comment BQ-2 regarding existing oversight mechanisms.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF L. NOREENE PARKER		
November 3, 1983		
	I, L. Noreene Parker, strongly object to the restarting of the L-Reactor.	
CF-1	I believe that at least the responsibility & the accountability of the DOE on this project, should be to strictly adhere to the present regulations governing nuclear facilities, since even these are, at best questionable and poor in protecting and informing innocent citizens.	See the responses to comments AA-3 and AF-1 regarding DOE's commitment to comply with applicable Federal and state environmental protection requirements and the differences between SRP and commercial reactors.
CF-2	The environmental and health damage that we know will occur is totally unacceptable and inexcusable, but the admitted projected damage that will occur is only the tip of the iceberg. The unadmitted and unmonitored accidents, the lack of proper inspections, and the total unwillingness to properly inform the public and to adhere to even the necessary precautions for ensuring environmental and public safety is an ongoing horror that should not be forced on to the people of this or any other area.	Routine and accidental radioactive releases have been documented, and potential radiation doses to the public have been calculated. In all cases, the radiation doses have been within radiation protection standards. Over the years, increased instrumentation, improved mitigation devices, and stricter procedural controls have reduced the magnitude and frequency of such releases. An annual report on the magnitude and dose effects of both routine and accidental releases is made available to the public.
CF-3	There is no acceptable excuse for such a harmful and dangerous development to be given any exemption or any lenient considerations when it comes to precautionary measures regarding release of contaminants, containment domes, or cooling towers. In re-opening even the simplest of commercial facilities, the current building codes and regulations must be adhered to; and old facilities must be brought up to standard. This simple rule should not allow for the release of harmful contaminants, the destruction of the environment and the needless endangering of the public on a slow and continuous basis.	See the response to comment AA-1 regarding cooling-water mitigation alternatives, and the response to comment BF-7 regarding containment and radiation protection standards. Although L-Reactor was constructed about 30 years ago, the thick concrete walls of the main reactor building and the stainless-steel equipment inside have shown little or no deterioration. About 60 percent of the 204-million-dollar restart cost is for improvements in the safety and operating

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		systems and effluent controls that have been developed and installed in the other SRP reactors since L-Reactor was placed on standby. These improvements, along with the restoration and upgrading work, will bring L-Reactor up to the standards of the other reactors. Inspections and testing before startup will verify equipment performance and reliability.
CF-4	I urge you to live up to your public responsibilities to protect the public from this type of intentional, irreversible destruction that we are powerless to protect ourselves against. We are struggling to protect and build on our natural resources in this prolific marine area. Building contaminants in our rivers, reefs, fish, and wildlife is not only harmful and ignorant; but also very dangerous to the economy of this area which depends on the aquifer for its water, and the rivers and ocean here for seafood and recreation. I wish to continue to live in this area and I believe that it is the responsibility of all of us to protect and rebuild our environment for future generations and not to create incurable contaminants and horrors for future generations to face because of our negligence and lack of concern for the future. ADDITIONAL COMMENTS MADE AT PUBLIC HEARING ON NOVEMBER 4, 1983	The Department of Energy will take all reasonable measures to assure that the environment is protected. The releases from L-Reactor operation, as identified in Chapter 4 of the EIS, are well within applicable standards and are monitored by DOE, the EPA, and the States of South Carolina and Georgia. No effects on the marine life in the Savannah River estuary, or the Atlantic Ocean, and no offsite contamination of ground-water aquifers have been detected. <u>The ground-water protection program at SRP is being extensively studied; a separate NEPA review for this program will be undertaken.</u>
CF-5	Another thing I would like to ask is: What will happen in case of an accident? Do we know in case something should occur? Will we have to pay for an accident, should it occur? What is the DOE doing to educate the public?	Indemnification of liability resulting from nuclear accidents involving DOE contractors would be in accordance with Section 170 of the Atomic Energy Act as amended. See also the response to comment AY-11 regarding emergency response planning.
CF-6	I am a scuba diver. I am not pleased with the solution. I would like to find out exactly what happens to the sediment when it is pumped out into the ocean? What happens to the low level radiation and to the low level waste if they are dumped in the ocean?	An evaluation of the fate of radioactivity released from SRP to the Savannah River upon reaching the ocean can best be done by examining the fate of fallout radioactivity resulting from past nuclear weapons testing. The amount of radioactivity from SRP reaching the ocean is only a very small fraction of that due to fallout. The total input of Cs-137 and Pu-239/240 to the Savannah River watershed from fallout is estimated to be 2800 and 55 curies, respectively, while the amounts of Cs-137 and Pu-239/240 released from SRP operations in the past are approximately 500 and 0.3 curies, respectively. Most of this radioactivity is retained by the watershed bound to soil or

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
CF-7	I believe this will continue up the food chain and could possibly harm us, definitely harm us, according to many biologists, in the future. I don't want to see this occur.	sediment, and only a small fraction reaches the ocean. Measurements of radioactivity in water, sediments, and marine life along the coast of the eastern United States indicate that radioactivity associated with the Savannah River outflow is similar to that of other rivers, reflecting the dominance of fallout radioactivity. Off-shore corings reveal sediment profiles of radioactivity that parallel the periods during which nuclear weapons testing occurred. The natural sedimentation processes occurring at the outflow of a river into the ocean and the associated delta formation tends to continuously cover older sediments with the newer sediments. Additional information has been included in Section 3.7.1.1 of this Final EIS. The dose models used at SRP are generally accepted by agencies involved in dose calculations--EPA, DOE, NRC, and ICRP. These mathematical models trace the dispersion of radioactivity into the atmosphere and waters until the radioactivity is taken up by a plant or animal (or directly by man). The models then account for any biological reconcentration that occurs through subsequent food chain elements to man, and any human organ discrimination factors. Also see the response to comment AA-2 regarding the relationship of radiocesium and radiocobalt concentrations to EPA drinking water standards.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF AMY DARDEN		
	My name is Amy Darden. I am speaking tonight as a concerned citizen and as a biologist. The Department of Energy has been blatantly negligent in assessing the environmental impacts of restarting the L-Reactor.	As discussed in Section 6.1.5 of the EIS, a series of health effect studies of the population around the Savannah River Plant have been made by Professor H. J. Sauer, who was originally with the University of Missouri and is now an independent contractor. Epidemiological studies of the SRP workers are being made by Oak Ridge Associated Universities and the Los Alamos National Laboratory. The Centers for Disease Control has also made some studies of the occurrence of a rare blood disease, <u>Polycythemia Vera</u>, in response to newspaper reports, since retracted, that this disease was unusually prevalent in the vicinity of SRP. Further, the Centers for Disease Control, in response to requests from DOE, has formed an independent panel to determine the need for any additional studies. The potential health effects due to SRP operations are predicted to be too small to be statistically detectable by health effects or epidemiological studies, particularly in the population outside SRP. Hence, primary reliance is placed on radiation monitoring and the calculation of expected health effects from monitored exposures. The States of South Carolina and Georgia and the EPA provide independent radiation monitoring offsite (see the response to comment BQ-2 for titles of the states' publications). As described in Appendix B, radiation doses are determined on the basis of the International Council on Radiation Protection Guides ICRP-2 and ICRP-30, while expected health effects are determined from those doses using the National Academy of Science's BEIR II and BEIR III reports. Similarly, the computer codes used to make necessary calculations are the XOQDOQ, GASPAR, and CRAC2 codes developed by the U.S. Nuclear Regulatory Commission.
CG-1	In the entire history of the Savannah River Plant there has never been an independent study of the environmental and health effects of the radioactive isotopes released in the forms of gases and effluents. The Environmental Impact Statement is largely based on data collected by the DuPont Company. How can citizens be assured of the accuracy of data collected by the operating concern?	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
CG-2	Nuclear facilities, whether bomb plants, commercial power plants, or government-owned reactors, have never been known for voluntarily releasing accurate and prompt information regarding accidents. The DuPont Company has been involved in the weapons industry since the early days of our nation's history when the manufacture of gunpowder was the primary defense industry. Savannah River Plant is operated to produce a capital gain for the operating concern. Can we entrust the safety of life in Georgia and South Carolina to self-inspection by the operating company? Isn't that a little like asking the fox to guard the chicken house? But it isn't chicken that is at stake; it is the well being of life in this area.	See the response to comment BQ-2 regarding independent monitoring. The Savannah River Plant is owned by the U.S. Government and operated by Du Pont without fee.
CG-3	Savannah River Plant is known to release more radioactive material per year than has been released by all commercial nuclear power plant accidents in all of time. Why is a facility that makes weapons grade material exempt from the same safety guidelines that commercial power plants are held to? Since 1968, when the L-Reactor was decommissioned, what new safety measures have been introduced and what new safety measures have been applied to the L-Reactor? Why are cooling towers and a containment dome deemed unnecessary?	Appendix J in the EIS describes the evolution of safety systems for SRP reactors. See the response to comment BF-7 regarding the need for a containment dome, the response to comment BF-6 regarding radioactive releases and standards, the response to comment CF-3 regarding restoration and upgrading of L-Reactor, and the responses to comments AA-1 and AA-3 regarding cooling-water mitigation measures and DOE's commitment to comply with all applicable Federal and state environmental protection regulations.
CG-4	The draft Environmental Impact Statement states that the radiation exposure to people from the L-Reactor operation is less than exposure from natural sources. The increase of cancer is insignificant. Yet according to the South Carolina Bureau of Vital Statistics infant mortality rates and cancer rates in counties adjacent to Savannah River Plant are four to ten times higher than other areas of the State.	Analysis of 1980 South Carolina fetal and neonatal death rates by counties demonstrated that the extreme high and low values observed occurred in counties with low populations and are, therefore, statistical anomalies not associated with distance from the Savannah River Plant. Studies conducted by Professor H. I. Sauer of the University of Missouri-Columbia (now retired) have revealed no evidence of unusual death rates from cancer or genetic effects, either for areas near SRP or for counties using downstream Savannah River water. Also see the response to comment CG-1 regarding prior health effects studies, ongoing epidemiological studies, and a review of these studies by an independent panel formed by the National Centers for Disease Control.
CG-5	What is an acceptable dose of radiation for plants, animals, or people? It takes only one radioactive particle, one cell, and one gene to initiate the cancer and/or the genetic mutation	See the response to comment CF-7 regarding radiation dose methodologies and biological reconcentration and the response to comments CG-1 regarding health effects and epidemiological studies.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	cycle. Can the Department of Energy assure the citizens that there will be no increased incidence of genetic mutations and cancer from the radioactive matter released by the L-Reactor? With a half-life in the hundreds of years these particles are a direct threat to all types of life--whether they are inhaled or ingested. As humans, we are high on the food chain--Is there any guarantee that the food produced in this area, the fish and shellfish in the Savannah River, will be free from cancer causing contaminants?	
CG-6	The Savannah River Plant has been described as "the bomb that has already been dropped." Indeed, it is a disaster area and we are in the contaminated zone. We go through each day wondering how much more radioactive gases have been released into the air we breathe, how much is in our water, in the food we eat; how much cesium, plutonium, and other harmful elements have made their way into our bodies and the bodies of others. The L-Reactor has produced plutonium and tritium for nuclear warheads to defend our nation's citizens from foreign aggression. BUT WHO WILL PROTECT THE CITIZENS FROM THE L-REACTOR? ADDITIONAL COMMENTS MADE AT PUBLIC HEARING ON NOVEMBER 4, 1983	See the response to comment BF-6 regarding radioactive releases and standards.
CG-7	Since 1968, when L-Reactor was decommissioned what new safety measures have been introduced and what new safety measures have been applied to the L-Reactor? Why are cooling towers and containment domes deemed unnecessary? What about the integrity of the reactor vessel itself?	Appendix J of the EIS summarizes the evolution of SRP reactor safety. About 60 percent of the upgrading and restoration costs for L-Reactor has been expended for improvements in the safety and operating systems and effluent controls that have been developed and installed in other SRP reactors since L-Reactor was placed on standby. Stainless steel equipment, including the reactor vessel, have shown little or no deterioration. Also see the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives, and the response to comment BF-7 regarding containment.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	I would like to quote just a little bit about plutonium itself. This from Dr. Helen Caldicott's book, <u>Nuclear Madness</u>. I highly recommend it to the DOE. "Plutonium is one of the most carcinogenic agents in the world, named after the god Pluto, god of the underworld. Less than one-millionth of a gram is enough to cause cancer." To put this into perspective, a gram is 1/252nd of a pound. In other words, 252 grams to a pound, and one-millionth of a gram is carcinogenic. "Because plutonium has properties similar to those of iron, it combines readily with the iron-transporting proteins in the blood and is conveyed to the storage cells in the liver and bone marrow. Here, too it irradiates nearby cells, causing liver and bone cancer and leukemia."	
CG-8	It is essential an independent oversight committee be established to monitor the operation of the L-Reactor, not only to restore public confidence in the DOE, but also to assure the safety of people and the ecosystem of South Carolina and Georgia. The decisions made by our generation regarding the startup of the L-Reactor will undoubtedly outlive us. It's a legacy that requires our complete and most sincere and deliberate attention.	See the response to comment BQ-2 regarding existing oversight mechanisms.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT ON THE REACTIVATION OF THE L-REACTOR		
	My name is Carolyn Tucker. I'm a resident of this city and am very concerned about the quality of life here, in particular, as well as about the quality of our entire environment in general.	
CH-1	It seems to me that the reactivation of the L-Reactor can in no way be advantageous to the residents of Savannah. If the L-Reactor begins operation, I can't help but think that the radioactive pollution in our river will ultimately increase. I also don't think that this additional reactor will in any way improve our groundwater supply. Since the L-Reactor has no cooling towers or containment domes, I can't help thinking that, in the event of an accident, our air quality will surely not be helped. Probably not many people in our area, if any, will find employment at the plant. In short, it seems that we have nothing to gain and quite a bit to lose if this restart begins as scheduled.	See the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives, the response to comment AA-2 regarding concentrations of radiocesium and radiocobalt, the responses to comments AJ-1 and BG-4 regarding seepage basins and DOE commitments for ground-water protection, the response to comment BA-5 regarding radioactive waste disposal, and the response to comment BF-7 regarding containment.
CH-2	But these are small considerations in the large scheme of things. The reason we're here tonight is because the L-Reactor is scheduled to be restarted after a decade and a half of moth-ball time. The reason the Reactor is being restarted is because we need more plutonium. We need more plutonium because we need newer and more modern nuclear weapons. We need more weapons because.... This is where the line of reasoning breaks down. Is there a need for bigger and better bombs? Don't we have more than enough now? It seems to me that the question of genuine need for additional plutonium should be addressed. The outrageous expense of the arms race and the cataclysmic results of nuclear war are two facts that should be dealt with when thinking about the L-Reactor, in addition to cooling towers and containment domes. Because in this instance, too, it seems that we have nothing to gain and everything to lose. Thank you for your attention. Carolyn A. Tucker November 4, 1983	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Statement to the Department of Energy on the Draft Environmental Impact Statement on the restart of the L-Reactor, SRP Savannah, Georgia November 4, 1983	
	I am Steve Johnson, a resident of Savannah, Georgia. I appreciate the opportunity for public comment and opinion in the decision-making process to restart the L-Reactor at the Savannah River Plant (SRP). I take very seriously my rights and responsibilities as a United States citizen. I see today's opportunity to comment as a privilege. I hope to offend no one today but I am compelled to speak out against the Department of Energy's handling of this major Federal action, which <u>may</u> have a very significant, long standing environmental impact without additional safeguards.	
	Thanks to an act of Congress, specifically in my opinion to the actions of Senator Mack Mattingly, the DOE has conducted an "expedited" environmental impact statement in accordance with NEPA, 1969. Citizens of Georgia and South Carolina, who, like myself, have contributed so much to U.S. defense efforts throughout history, have always recognized what is involved in maintaining a sound defense posture. I agree wholeheartedly with Senator Sam Nunn who stated that "defense posture must be built on a firm foundation of public support and understanding." The previous actions of DOE to initially forego an EIS has <u>not</u> served this goal. My trust and confidence in their assurances of public safety is simply not there. There are too many questions which people who are experts in the field are not in agreement on, in terms of some of the public health and safety aspects of the proposed L-Reactor restart. This clearly erodes the tenuous support for the current Administration's desire to build up the nation's supply of nuclear defense	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	materials in an effort to demonstrate to the Soviet Union, our resolve to defend freedom.	
CI-1	Precedence does exist demonstrating that our national security requirements and our public health and safety/environmental concerns can be met simultaneously. However, there are widely published historical examples to the contrary. The DOE has broken with its traditions of self regulation. In the EIS, it seems to say that the SRP operations do not have to by law comply with public health and safety regulations of the Nuclear Regulatory Commission, as commercial nuclear facilities do. Therefore, to use a euphemism, the cook cleans his own kitchen.	See the response to comment AA-3 regarding DOE's commitment to meet all applicable Federal and state environmental protection requirements, the responses to comments BF-7 and BF-8 regarding the differences between SRP and commercial reactors, and the response to comment BQ-2 regarding existing oversight mechanisms.
CI-2	Informed public confidence must be restored. Continued debate on alternatives within the existing proceedings will fail as long as DOE argues alternatives with the <u>overriding</u> considerations on production goals--"time and expense" to quote S.C. State Rep. Harriet Keyserling. Clearly, even the need for such production is now open for question. And why not? Sen. Sam Nunn talks about a "build down" proposal for arms control negotiations. As I understand it, two nuclear warheads (made of plutonium) will be disassembled for every one modernized warhead built. What would happen to that plutonium? I do not have the classified information to make an educated opinion; does Sen. Nunn?	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS. Also see the response to comment BL-19 regarding use of material from retired weapons.
CI-3	I have been to each of these public hearings and reviewed the published records. I am proud to see that State and Federal officials representing the citizens of Georgia have voiced their concerns, and suggestions as to how to restore public confidence. I strongly support Congressman Lindsay Thomas' proposal for an independent oversight task force. The current proceedings certainly aid in the examination and assurance of public safety but too much, <u>much too much</u> doubt has been cast onto the reliability of existing mechanisms that assure national security requirements (production goals) and public safety concerns are and can be simultaneously met. Furthermore, Congressman Thomas is right in his concern that there is no long range plan for the study of the cumulative effects of all the nuclear facilities within the Savannah River Basins. I have the hope to settle in this region, raise a family and invest my money in business here. I believe I have a right to	See Section 5.2 of the EIS. These are the known plans for additional nuclear facilities in the Savannah River Basin.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	know about the L-Reactor's impact. I intend to ask Congressman Thomas to follow through with his proposal, and I will ask Senators Nunn and Mattingly to back such efforts. My trust, confidence and understanding in this matter of national defense is confused by and lacking in the DOE's own evaluation of its operation's impact on my safety and surrounding environment and more importantly my children's.	
C1-4	Independent oversight is essential in my opinion. Why else would we be sitting here listening to such public and expert concern and objection to the restart of the L-Reactor at SRP. Thank you for your time and again I hope I did not insult anyone here today with my comments. Respectfully, Steve A. Johnson, Ph.D. 608 East 57th St. Savannah, GA 31405	See the response to comment BQ-2 regarding existing oversight mechanisms.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF EDWIN LONGWATER		
Let me begin by saying that I do not feel the least bit honored to be speaking to DuPont via the Department of Energy. I testified on May 26, 1983 and stated that I was a life time resident of Chatham County. I did consume a lot of shellfish and fish from near the mouth of the Savannah River at Tybee Island. In response DOE asserted that fish and crabs near the coast are routinely sampled for radioactive contamination as contained in the 1982 Annual Report.		
CJ-1	Looking through this report, shellfish were omitted! Why? Were they too radioactive all too often? It also gave the whole body dose for an adult in 1982. I was an infant in 1952 and grew up along this coast. What about my contamination? In this report it stated that these studies included 8 crab and four (4) oyster samples. Are you trying to get me to believe that this small of a sample along our twisted Savannah River is representative of all oysters along the river or were these samples picked because lower radiation would be found in some areas? I want a larger study done not by DuPont or DOE but an independent agency. After all, over and over in the Draft EIS are the words: "The responsibilities of DOE...to develop and maintain a capability to produce all nuclear materials required for the Defense programs of the U.S....As a matter of policy, national security requirements, not arbitrary constraints... shall be the limiting factor.	Current levels of radioactivity in oysters and crabs taken from the Savannah River Estuary are summarized in the 1982 annual report (Environmental Monitoring in the Vicinity of the Savannah River Plant, DPSPU 83-30-1, page 12). As stated in the report, cesium-137, other gamma emitters, and strontium-90 were below detection limits. The oysters were collected at Fort Pulaski, about 5 kilometers from the mouth of the Savannah River at Tybee Island, and the crabs were purchased from a shrimp boat that operated in the mouth of the Savannah River. Relatively large sample sizes were required because of the low levels of radioactivity. Each of the four oyster samples contained about 500 grams of oysters (approximately 400 oysters per sample). Fourteen crabs were combined into the eight crab samples. The results of the 1982 analyses on shellfish from the Savannah River Estuary are the same as for previous analyses on shellfish published in earlier annual reports of this series. The 1982 annual report referred to above (DPSPU 83-30-1, page 11) gave the whole body dose to a hypothetical adult who consumed fish containing 0.57 picocurie per gram of cesium-137 (the average cesium concentration in fish taken from the river just below SRP). The calculated doses to hypothetical teenagers and children eating fish with this same concentration of cesium-137 are smaller than for the hypothetical adult by factors of about 2 and 5, respectively. Shellfish taken from the

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		Savannah River Estuary in 1982 contained less than one-fifth as much cesium-137 as the river fish assumed in the dose calculations.
CJ-2	Are we to allow DOE to clean their own kitchen? When DOE begins to talk about their environmental consequences why does the second paragraph deal with the 420 new jobs the L-Reactor will provide and the increase in money coming through the surrounding area around SRP? I feel the people of Georgia and South Carolina do not deserve to have more contamination pushed down our throats.	The 400 jobs discussed in the second paragraph of the Environmental Consequences Section of the Summary is only a part of the National Environmental Policy Act requirements to discuss the impact of this project. SRP operations are closely monitored by both state and Federal agencies to ensure compliance with all applicable statutes and regulations concerning environmental protection. See the response to comment BQ-2 regarding existing oversight mechanisms.
CJ-3	Going back to this study if that 98% of the 300 fish had no measurable amounts of radiation. What about those other 6 fish? Where were they found and how much did they contain? I might have eaten their brother or sister for lunch last year!	The 1982 edition of the <u>Environmental Monitoring in the Vicinity of the Savannah River Plant</u> provides the data concerning the measured levels of concentration in fish including the 2 percent for which there were detectable concentrations. As contained in Chapter 6 of the EIS, fish provided by the Georgia Department of Natural Resources are also analyzed.
CJ-4	In previous testimony I also stated that in 1974 in a single day 479,000 curies of tritium were released into the atmosphere. An Arizona facility 5 years later released a little more than half this amount; its license was revoked. Furthermore, between May 30 and June 3, 1961 SRP released the single largest amount of radiiodine ever reported in scientific literature for a U.S. facility, a release of 10 x that of TMI. What did DOE say to make me feel secure? "Some additional radioactive releases have occurred from reactor support operations. These have been documented and potential radiation doses to the public have been calculated. IN ALL CASES THE RADIATION DOSES HAVE BEEN WITHIN DOE STANDARDS--WHICH MEANS THAT RADIOLOGICAL HEALTH EFFECTS HAVE BEEN NEGLIGIBLE. EITHER DOE STANDARDS NEED REVISING OR DOE IN MY ESTIMATE IS NEGLIGIBLE.	See the response to comment BA-4 regarding the releases of tritium.

Thank you.

Edwin Longwater

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
ADDITIONAL COMMENTS MADE AT PUBLIC HEARING OF NOVEMBER 4, 1983		
CJ-5	DOE then goes on to assure us, "which means that radiological health effects have been negligible."	See the response to comment BF-6 regarding radiation protection standards.
	I state this not in agreement with all scientists. There are many scientists who feel that these effects are not negligible, that they are not safe at all.	
CJ-6	Either DOE standards need revising or the DOE, in my estimate, is in itself negligible.	The purpose of this EIS is to analyze the potential environmental consequences of the L-Reactor restart and its alternatives. The assumptions used in the DEIS for relevant standards and for data collection and analysis are based on existing Federal regulations; almost all were derived outside DOE. Chapter 7 discusses these laws and regulations. Appendix B discusses the assumptions for radiation exposure and radiation dose analysis; it points out that exposure standards are based on recommendations of the International Council on Radiation Protection, the former Federal Radiation Council, EPA, and NRC; health effects assumptions are based on the recommendations of the National Academy of Sciences; and computer analysis assumptions are based on computer codes developed by NRC. An extensive reference list backs up the EIS.
	The EIS represents nothing more than an invalid conclusion based on unproven assumptions and faulty documentation and data collection, gross generalizations.	
	In short, the Draft EIS is not sufficient. In talking with several individuals at the document table tonight, I asked about studies done on shellfish in this area, particularly oysters, since they are stationery along the riverbank. They don't move around such as crab and things like that.	
	I found out three things: Either the studies were not conducted; their results were not published; or they did not know where I could find this information.	Except for a small amount of classified material, all the documentation has been made available.
		See also the response to CJ-1 regarding the sampling and analysis of shellfish.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF JANIECE BRODHEAD November 4, 1983 9677 Whitefield Ave. Savannah, GA 31406		
CK-1	To whom it may concern, As a mother of one child and another on the way, I feel it is my personal responsibility to speak out against the restart of the Savannah River Plant L-Reactor. We are already dealing with the severe ecological implications that nuclear buildup has placed on our environment with nuclear waste and storage. Restarting the L-Reactor will escalate these problems especially to those living downstream from Barnwell and drinking water in the Jasper-Beaufort, South Carolina area. The continued buildup of nuclear arms is insane when you realize that in nuclear war nobody wins. I'm sure that a world in which a nuclear bomb has been dropped, no matter what hemisphere or country, will be virtually uninhabitable, considering radiation fallout, temperature change, mutation of the food chain, etc. Please, for the sake of my children's safe future do not restart the L-Reactor and add to an arms race where everyone will lose. Sincerely, Janiece Brodhead	See the responses to comments AA-2 and BT-2 regarding radio-cesium and radiocobalt concentrations and water quality, and the response to comment BA-5 regarding radioactive waste disposal. The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

M-221

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
Statement on the L-Reactor Draft Environmental Impact Statement		
November 4, 1983		
CL-1	As a citizen and business person from Savannah, Georgia, I wish to register my concern with the Draft EIS. I feel that there is a great need for an independent study of the effects of starting the L-Reactor on the environment of the surrounding area. There needs to be an assessment done by people who do not have a vested interest in this reactor's operation. There are grave questions to be answered about the unusually high incidence of some health problems in the area surrounding the Savannah River Plant as it now operates. There is too great a risk to the population and the environment to start the reactor without such an independent study.	See the response to comment CG-1 regarding health effects and epidemiological studies, and the response to comment BQ-2 regarding existing oversight mechanisms.
CL-2	I am very concerned that there be adequate cooling towers, a containment dome and waste storage facilities before the reactor is started again. I have heard the Savannah River Plant called "the bomb that has already been dropped on South Carolina" because of the amount of radiation that the SRP already releases into the environment and I have every reason to believe that those of us down river could make the same statement. It is very important that there not be an increase in the pollution being released and something needs to be done about what already is coming our way. Again I ask that the seriousness of the potential problems of the restart of the reactor be given the most careful and reliable study and that the health of the living things, humans, animals, and plants, of our area be given the value we deserve. Sincerely, Linda M. Jeanne 103 S. River Street Savannah, Georgia 31401	Radiation levels and doses in the vicinity of SRP and down to Savannah are given in Sections 4.1.2, 5.1.2, and 5.2.6 and in Appendix B of the EIS. They are shown to be a very small percentage of background radiation. Also see the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives, the response to comment BF-7 regarding containment, the response to comment BA-5 regarding radioactive waste disposal, the response to comment BQ-2 regarding existing oversight mechanisms, and the response to comment BM-1 regarding DOE's Record of Decision.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF DEBBIE KEARNEY		
CM-1	"Since the splitting of the atom, everything has changed save our mode of thinking ... and thus we drift towards unparalleled catastrophe." I'm paraphrasing Albert Einstein. He obviously recognized the dangers inherent in nuclear power. Yet DOE treats the reconstruction and restart of the L-Reactor like it's the opening of a shoe store. No big deal. What's the public uproar about?! I'm testifying at this hearing because I think it is a big deal. I'll refrain from a repetition of the major concerns I have, like health and safety hazards and ecosystem losses. I've delineated them in other testimony. You're aware of my concerns and I suspect you give the same pat answers. And then say "Trust us." Well--you've given me no reasons to trust you and many reasons to doubt you.	From the outset, DOE has emphasized the protection of the public health and safety in conjunction with the restart of L-Reactor. As described in the EIS, DOE has expended about \$204 million in modernizing and renovating L-Reactor. The Department has also spent more than \$5 million in environmental studies and reports. Twelve public hearings have been held in South Carolina and Georgia, to elicit public comments. Also see the responses to comments AA-1, AA-3, and AB-13 regarding cooling-water mitigation alternatives and DOE's commitment to comply with all applicable state and Federal environmental protection regulations, the response to comment BF-7 regarding containment, and the response to comment BQ-2 regarding existing oversight mechanisms.
CM-2	My understanding of the conclusions drawn in the draft EIS is that greater safety features and better cooling alternatives cannot be implemented because they cost too much in time and money. In other words, the health and safety of thousands of people downriver and downwind from SRP aren't worth such and so million \$ and a few years. I strongly object to a value system that puts time and money considerations before people considerations!!	See the response to comment BM-1 regarding DOE's Record of Decision on this EIS.
CM-3	What's even more outlandish is that we discuss this issue as if we know exactly what the costs of restarting the L-Reactor will be--I mean costs in terms of environmental damage and subsequent consequences, human health and safety, as well as time and money. The fact is that we don't. We DO NOT KNOW what the cumulative effects of the nuclear operations at SRP are and will be. We continue to produce more plutonium and tritium without knowing what to do with the radioactive waste we	Section 5.2 of the EIS describes the cumulative effects of present and proposed SRP facilities and those of other nuclear operations in the vicinity of SRP. Also see the response to comment AV-2 regarding radioactive waste disposal, and the response to comment CG-4 regarding infant mortality rates.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
CM-4	already have. We allow SRP to continue production without questioning the fact that the counties south of SRP have an infant mortality rate 5 times greater than the rest of S.C. and S.C. has the highest infant mortality rate in this country!! If the L-Reactor is going to be restarted (and it seems that no matter what we do, it will go on-line), I feel I have a right as a citizen to ask--demand--that certain protective actions be taken first. I'd like the restart contingent upon a cooling alternative like cooling towers, greater safety mechanisms (I'd like to see a containment dome built), and an independent oversight committee composed of government officials and concerned citizens as suggested by Rep. L. Thomas. Most important, I want a long-term study of the cumulative effects of SRP on the environment and on the people. Please spare me the argument that there's no time. There are alternatives if the plutonium and tritium must be produced immediately which I also question. If you think I'm angry you're right. And if you detect cynicism and a sense of futility, you're right about that too. I desperately want Savannah and this coastal area to be a safe, healthy, beautiful and bountiful place. The SRP is a major threat. If we must start new reactors, let's at least require that they have the maximum health and safety features. And give consideration to the <u>real</u> costs of starting a reactor.	See the responses to comments AA-1, AA-3, and AB-13 regarding cooling-water mitigation alternatives and DOE's commitment to comply with all applicable state and Federal environmental protection requirements, the response to comment BF-7 regarding containment, and the response to comment BQ-2 regarding existing oversight mechanisms.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MS. JAY		
	I come here because I am a health care worker and a parent and a concerned citizen of southeastern Georgia.	
CN-1	The startup of the L-Reactor is a concern of those from the surrounding counties because we know nuclear accidents are possible, as was learned from the Three Mile Island incident. A similar accident at the Savannah River Plant L-Reactor would be catastrophic to this area because of the lack of the cooling tower and containment domes in the aging facilities, and the release of increased temperature water would change the local ecosystem of the streams and riverbeds in the area of the plant.	Cooling towers are not related to the mitigation of potential reactor accidents. See the response to comment BF-7 regarding containment domes and safety system mitigation alternatives.
CN-2	I am of the first generation who have had to live our entire lives with the threat of the ultimate annihilation of humankind due to nuclear weapons. Now, a second generation is coming into the world with this over their heads. In some ways, I feel guilty for bringing my daughter into a world where a computer foulup or a flock of geese could cause a full-scale nuclear war.	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.
CN-3	To me, the ultimate question of the L-Reactor startup is: Do we need more nuclear weapons...? I request the formulation of an oversight committee for the operation of the Savannah River Plant L-Reactor and the installation of containment domes.	See the response to comment BQ-2 regarding existing oversight mechanisms, and the response to comment BF-7 regarding containment domes.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF JUDY JENNINGS		
November 4, 1983		
My name is Judy Jennings. I am a housewife and I have lived in Savannah, Georgia, for six years.		
CO-1	I appreciate the opportunity to speak to you but I admit I am somewhat puzzled. I read every day that many citizens and many Congressmen oppose further build-up of nuclear weapons and support alternatives such as the Build Down Proposal and the Nuclear Freeze. If we are really dedicated to reducing the threat of nuclear war, why do we need another facility such as the L-Reactor at the Savannah River Plant to produce more fuel for more nuclear weapons?	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.
CO-2	However, if it is inevitable that the L-Reactor operate and if it operates as indicated in the draft Environmental Impact Statement, I feel that my health and life, my friends' and family's health and lives, and the environment will be in constant jeopardy. I would feel safer if the L-Reactor had a containment dome and cooling towers and if an independent oversight committee were established to oversee L-Reactor operations.	See the responses to comments AA-1, AA-3, and AB-13 regarding cooling-water mitigation alternatives and DOE's commitment to comply with all applicable state and Federal environmental protection regulations, the response to comment BF-7 regarding containment, and the response to comment BQ-2 regarding existing oversight mechanisms.
CO-3	Basically, I would like to see the EPA or NRC review the draft Environmental Impact Statement. Thank you.	The Georgia Department of Natural Resources, the South Carolina Department of Health and Environmental Control, the Nuclear Regulatory Commission, and other Georgia, South Carolina, and Federal agencies received copies of the EIS. As required by the Energy and Water Development Appropriations Act, 1984, the EIS was developed in consultation with the States of Georgia and South Carolina. DOE provided working drafts of the EIS to the states, met with their representatives, and incorporated their comments into the EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	COASTAL CITIZENS FOR A CLEAN ENVIRONMENT 4405 PAULSEN ST., SAVANNAH, GA 31405 STATEMENT BEFORE THE DEPARTMENT OF ENERGY BY REBECCA R. SHORTLAND FOR COASTAL CITIZENS FOR A CLEAN ENVIRONMENT ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT ON THE RESTART OF L-REACTOR Savannah, GA. November 4, 1983 My name is Rebecca R. Shortland and I am here on behalf of Coastal Citizens for a Clean Environment (CCCE). This is the third occasion during which CCCE has presented testimony in response to the Department of Energy's (DOE) mandate - to restart the L-Reactor at the Savannah River Plant without certain safeguards, which we feel, and have felt since August 1982, are vehemently necessary. Our comments are directed to the Draft Environmental Impact Statement (DEIS), which exists because it was required by an act of Congress and the courts, not because DOE chose to voluntarily follow the NEPA process.	
CP-1	In reviewing this document, we find that the overall attitude is precisely that which was the result of the Environmental Assessment (EA) conducted by DOE and released in 1982 - no significant impact as the result of the proposed operation of L-Reactor. Our concerns have been expressed many numbers of times since the EA was released, and echoed by many others including our Congressmen, local officials and various organizations and individuals in both Georgia and South Carolina. The concerns and questions remain the same.	See the response to comment BM-1 regarding DOE's Record of Decision on this EIS.
CP-2	Again, we reiterate the need for an alternative and adequate system for recycling of the cooling waters other than that proposed by DOE (direct discharge into Steel Creek). The resulting destruction of 1000 acres of wetlands, the subsequent ruin of wildlife habitat (including that of endangered species), and the resuspension of radioactive cesium and cobalt into the Savannah River are unacceptable. The construction of an alternative, such as cooling towers with complete recycling, is	See the responses to comments AA-1, AA-3, and AB-13 regarding L-Reactor cooling-water mitigation alternatives and compliance with applicable environmental protection requirements, and the response to comment AA-2 regarding resuspension of radiocesium and radiocobalt. The EIS has been revised to reflect the current status of consultations on endangered species.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	necessary and possible in order to eliminate this ruinous impact and the threat that it poses to human health.	
CP-3	Additionally, an alternative and adequate system for containment of L-Reactor is mandatory. The existing containment would not shield the environment and its people from distribution of radioactive gases in the event of an accident at L-Reactor. The DEIS emphasizes the "low" probability of such an incident. However, that low probability is a far cry from <u>no</u> probability when so much is at stake.	The existing SRP airborne activity confinement system is designed to trap more than 99 percent of the iodine and particulates that would be released as a result of a reactor accident. Noble gases and tritium releases would not be trapped but would be dispersed by a 61-meter stack. With the SRP confinement system, the consequences of all credible accidents are well within the NRC reference values for reactor siting (10 CFR 100). Also, see the response to comment BF-7 regarding containment. Neither a containment nor improved confinement system would be capable of eliminating potential consequences from all very-low-probability accidents.
CP-4	Because there is a demonstrated conflict of interest between DOE's production and safety goals, we believe an independent oversight committee should be established. "Independent" is defined as outside of DOE, DuPont or NUS Corp.; however, a representative would be included in the Committee. Other proposed participants could include representatives from the states of Georgia and South Carolina, the U.S. EPA, the Nuclear Regulatory Commission (NRC), as well as citizen representation. This later element could, perhaps be filled by choosing representatives from the plaintiffs (those involved in the legal action over L-Reactor's restart), and representatives of regional community organizations or local officials. We believe that such a committee could succeed in improving the public's confidence in DOE's operations and create needed guidelines.	See the response to comment BQ-2 regarding existing oversight mechanisms.
CP-5	We also call for the cessation of the use of seepage basins at SRP as the method for disposal of highly toxic and radioactive substances, which then leak into our water supplies, both surface and ground water. And, in particular, we object to the initiation of yet another seepage basin for use with L-Reactor. The above points are but a few of the concerns which we have expressed to date, but those which we believe must, and can, be implemented prior to the restart of L-Reactor. The DEIS does address many of the variety of points posed by CCCE and	See the responses to comments AJ-1 and BG-4 regarding the use of seepage basins and DOE commitments for ground-water protection.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
CP-6	others. However, we believe the DEIS is inadequate. One example is the material gathered in the scoping process. The DEIS scope is based upon information from hearings in February and May of this year, as well as other sources. However, there are errors and deletions of oral testimony in these documents, which lead us to believe the scoping process is incomplete.	DOE based its preparation of the draft EIS on comments received in the Environmental Assessment from August 1982 to August 1983; on the February 9, 1983, Senate Armed Services Committee Hearings; on the 90-day public review and comment period on the record of the Senate Armed Services Committee hearing from April 18 through July 17, 1983; and on a 22-day scoping comment period and hearings on the DEIS that ended August 14, 1983. This EIS addresses the substantive comments that were received. All hearings and meetings conducted by DOE in May and August were recorded by certified court reporters verbatim and published in hearing records/scoping reports. DOE knows of no errors or deletions of oral testimony.
CP-7	As the DEIS stands, DOE's conclusions can be summarized in one statement (p. 4-82) - "Any alternative that postulates a delay of the restart necessarily results in a loss of production that cannot be recovered." The loss in question is the production of nuclear materials, plutonium and tritium, for our country's nuclear weapons program. We dispute DOE's claim for the need based on available documents and occurrences since the mandate was determined in the Carter Administration. But, further, should we accept these claims, whether the "need" is in the form of actual deteriorating warheads, surplus, or in the form of a statement to the Soviet Union, there are alternatives. This administration and DOE directly have proposed the increase of output of nuclear materials through several alternatives to be implemented in the near future, one of which is L-Reactor. We believe it is possible to shift the focus of implementation which would create the drastically needed time to affect the above safeguards, so that the impacts on our lives in this region would be less detrimental.	The statement given on page 4-82 of the draft EIS represents an "impact" from the implementation of a mitigation alternative and is one factor in evaluation of the alternatives. Also see the response to comment BL-18.
CP-8	Because the DEIS does not adequately investigate all of the alternatives, we view this document as insufficient and incomplete. We request that DOE reevaluate the feasibility of combined and expedited sources so that initiatives toward the proper control mechanisms can begin as soon as possible, and thereby avoid the possibility of even further delays in restarting L-Reactor.	See the responses to comments AB-2 and BL-15 regarding information contained in the EIS on need and production alternatives.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
CP-9	Throughout the DEIS, as was the case in the EA, the inflexible "need" for nuclear materials is repetitively pitted against our health, our safety and the quality of our environment. Assuming that the above requirements for proper controls could indeed be met without the immediate restart of L-Reactor, and the DOE chooses to turn its back on this possibility, can they justify the probability of accelerated contamination of our air and water supplies, the destruction of our vital wetlands (which are being eliminated worldwide at an alarming rate), and the impacts on the health and safety of the people in this region. And, further, can you justify the cost with which we the taxpayers will be charged in the aftermath of your decisions.	See the response to comment BL-15 regarding the need for defense nuclear material, the response to comment BM-1 regarding DOE's Record of Decision on this EIS, and the response to comment AA-3 regarding DOE's commitment to comply with all applicable Federal and state environmental protection requirements.
CP-10	For example: How is it possible to justify the use of a seepage basin for L-Reactor when this same method of disposal (in the M-Area) has led to contamination of the aquifer and a clean-up price tag well in the millions of dollars? If these damages can be avoided, how can DOE choose otherwise?	As noted in response to comment BG-4 and in EIS Section 4.4.3, use of the L-Area seepage basin would reduce the radiological dose to users and consumers of Savannah River water. Section 4.4.3 describes alternatives to the use of the L-Area seepage basin. Studies of the hydrostratigraphic units show that conditions at L-Area are different from those at M-Area (Sections 4.1.1.3, 4.1.2.2, and 5.1.1.4). If the L-Area seepage basin is used, analyses indicate that the filtered and deionized disassembly-basin wastewater will seep into the shallow ground water and flow laterally to seep line springs along Steel Creek.
	In conclusion, I again urge DOE and the current Administration to seriously consider the concerns expressed here tonight. These past 15 months of scrutiny of L-Reactor and SRP operations have produced only more intense concerns, not less, despite the mounds of documents produced by DOE and DuPont Corp.	
	We believe the time has long been overdue for DOE to take the positive steps of implementation of the preceding safeguards in order to meet their mission and relinquish the questions of its overall operations.	
	Thank you.	
	ADDITIONAL COMMENT MADE AT PUBLIC HEARING OF NOVEMBER 4, 1983	
CP-11	And I would like to point out the cost of cooling towers is only estimated at some 39 million. That seems to be rather unequivocal in some terms.	Comment noted. Also see the response to comment CP-2.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
CQ-1	Statement Provided by The U.S. Environmental Protection Agency Region IV, Atlanta, Georgia U.S. Department of Energy L-Reactor Restart Savannah River Plant Savannah, Georgia November 4, 1983 My name is Arthur G. Linton and I am the Federal Activities Coordinator for Region IV, U.S. Environmental Protection Agency. I am presenting this statement on behalf of Charles R. Jeter, Regional Administrator, Region IV, in Atlanta. It should be recognized that our comments address only environmental concerns and do not attempt to rationalize the need for additional weapons grade nuclear material or the need for the restart of this facility in view of other overriding national concerns. The Environmental Protection Agency has a long history of involvement with the environmental affairs at the Savannah River Plant and has been intensely involved in the assessment of environmental concerns during the past year. The Regional Administrator has, for example, presented testimony to the Armed Services Committee chaired by Senator Thurmond on the restart of the L-Reactor on February 9, 1983. Our most recent action in EPA has been the review of the Draft Environmental Impact Statement which was required for the restart of the L-Reactor and we are formally responding to the Department of Energy concerning our position. We have expressed concern over a number of significant environmental issues which remain unresolved or are still under study in an effort to effect mitigation. The most important of these matters are groundwater contamination, discharge of heated effluent into Steel Creek (which will result in the destruction of extensive wetlands) and the uncertainty involving the disposal of various potential and actual hazardous wastes generated from reactor operations.	See the DOE response to the entire EPA comment letter included as comment letter "DA" in this appendix.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	On the basis of these concerns, we have rated the Draft EIS as EU-2, that is, we have determined that the L-Reactor restart is environmentally unsatisfactory in its currently proposed design in that the document does not provide sufficient information regarding the corrective measures that will be employed to avoid adverse environmental impacts. We know that the DOE is presently working on developing these measures, in cooperation with the regulatory agencies. We believe that much of the additional information that we have requested is already available to you and should be included in the Final EIS. Of special concern to us is the development of a proper permit under the National Pollutant Discharge Elimination System (which is administered by the State of South Carolina), and the methods to control the contamination of groundwater, and the treatment and disposal of various potential and actual hazardous wastes generated from reactor operations. We will continue to coordinate with the state agencies and DOE with respect to utilizing the regulatory mechanisms that are in place, to insure that the environmental concerns addressed above can be satisfactorily resolved.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MS. HELEN BLOOM		
CR-1	I'm Helen Bloom, and I come as a citizen of Savannah. The Draft of the EIS makes for very scary reading. In addition to the continuing concern about the contamination of drawn water, about the adverse impact on one thousand-plus acres of wetland, and because of the discharge of thermal effluents, about the deterioration of the Savannah River and the surrounding atmosphere, and the questions on the safe disposal of the high-level waste, there are other areas of concern regarding the Savannah River Plant L-Reactor.	DOE will comply with all applicable Federal and state requirements concerning environmental protection. Section 4.1.1.5 of the EIS compares liquid effluent chemical loads with the corresponding water-quality or drinking-water standard and with concentrations measured in Steel Creek and in the Savannah River above and below the SRP. Available measurements from the Savannah River indicate little variation in measured quantities between upstream and downstream locations from present SRP operations; L-Reactor operation is not expected to alter this situation significantly. As stated in Section 4.1.1.6 of the EIS, the operation of L-Reactor will not violate any ambient air-quality standard. L-Reactor thermal effluent impacts in the river for the reference case are expected to be small; a zone of passage for anadromous fish and other aquatic organisms will exist in the river. The thermal impact to wetlands for the reference case is expected to be similar to conditions that occurred during earlier L-Reactor operation. About 1000 acres of wetlands will be affected over a number of years of reactor operation from the reference case thermal discharge. The impacts on wetlands are described in Section 4.1.1.4 and mitigation alternatives are described in Section 4.4.2 and Appendix I of the EIS. Also see the response to comment AA-1 regarding cooling-water mitigation measures. The volume of high-level radioactive waste to be generated by chemical processing of L-Reactor material was considered in the Defense Waste Processing Facility EIS (Section 5.1.2.8 of the EIS). See the response to comment BG-9 concerning terrorist attacks.
CR-2	By restarting the L-Reactor to produce plutonium in an area where there are already three other nuclear reactors in operation, and another reactor on the way, we may be providing terrorists with an exceptionally attractive target area.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	What would be the consequences to the more than half-million people living within the 80 kilometer and beyond the vicinity of the reactors if suicidal-type terrorists cause severe damage to or destroy any one of the five nuclear reactors?	
CR-3	Would it precipitate a chain reaction of nuclear reactor destruction?	An accident at one reactor site would not lead to an accident at another site.
CR-4	And finally, we ought to delay restarting of the SRP L-Reactor to study further the very need for plutonium.	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.
	Just a few days ago Dr. Carl Sagan and Paul Erhlich, representing the views of many scientists and biologists, have said the latest scientific findings indicate that the United States by itself already has, and in fact has had for several years in its nuclear power arsenal, enough nuclear power armament to destroy all life on earth.	
	Thank you.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF ANDREAS NISSEN		
	I have read from the Draft Environmental Impact Statement, and I am not satisfied with the safety and environmental protection measures in place at the Savannah River Plant. Because many people do not have the technical expertise to determine from that document the damage that will be done to the communities surrounding the Savannah River Plant, I would like to point out something in a very nonsensical way, a down-to-earth way. Insurance companies are some of the largest and most successful institutions in the world. They got that way by professionally assigning risks. For instance, they do not ensure people with bad driving records. They do not ensure hazardous dwellings, or they do not ensure suicides.	
M-235 CS-1	They also will not ensure nuclear facilities, such as the Savannah River Plant. Does this not indicate that these plants must be made safer? It does to me.	An insurance pool in the United States currently provides \$160 million of liability insurance for commercial nuclear facilities and nuclear materials transportation in addition to insurance they offer to cover property damage to the facilities themselves. Individual private insurance policies (such as homeowners policies) usually exclude "nuclear damage" because that is covered on essentially a "no-fault basis" by the liability insurance described above. The Federal government is financially responsible for damage caused by its operations.
CS-2	In Savannah River Plant's case, we, the citizens who live here, as has already been stated by several speakers, we need a proper containment dome. We need adequate effluent water decontamination and cooling devices, and because of past experience with nuclear accidents, we need an independent oversight committee to act as a watchdog over this extremely hazardous facility.	See the responses to comments AA-1, AA-3, and AB-13 regarding cooling-water mitigation alternatives and DOE's commitment to comply with applicable Federal and state environmental protection regulations, the response to comment BF-7 regarding containment, and the response to comment BQ-2 regarding existing oversight mechanisms.
	Thank you for allowing me my comments.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MR. JOHN MACLEAN		
CT-1	My name is John Maclean, and I'm speaking for myself. I have several points, the first being that I have waded through the EIS and "waded through," I think, is the appropriate description, and among several of the facts that I found were not clarified or clear to me were the percentages of cancer deaths that would result from the startup of the L-Reactor and also the percentage of the mutations or deformities in children being born in the area, within the 80-mile area, of the Aiken plant. The rates, as stated in the EIS, were three per thousand cancer deaths and four per thousand for deformities. The problems with these rates is that, if, in fact, they are true, you are talking about a city, say, for example, Savannah, of 100,000 people, you would be talking about 300 people per year dying of cancer because of the L-Reactor or 400 people per year having deformities when they are born, because of the L-Reactor. These levels, of course, are unacceptable. It would be hard to tell your wife or child that they were being sacrificed for the L-Reactor. I think, in fact, that these figures are wrong, that what you mean to say -- I hope you mean to say -- that it's three per thousand, or .003 excess cancer deaths above the ones that you would normally have. The problem is that is not spelled out in the EIS. I think you have to clarify that. It would certainly ease my mind if you would clarify that so that I don't leave the permanent EIS, thinking that I'm going to see my wife or child suffer because of the L-Reactor. I can't believe that the percentages are that high, and I think this should be clarified because it's not clear in the EIS.	The calculated potential excess cancer fatalities and genetic disorders (not the percent of increase) are presented in Section 4.1.2.6 for L-Reactor operation, in Section 5.1.2.5 for support facilities, and in Section 5.2.7 for all nuclear facilities within 80 kilometers. The increased incidence of health effects is expressed in terms of effects (cancer or genetic effects) per 1,000,000 person-rem. The risk estimator factors used in the EIS were 120 cancers and 257 genetic effects per 1,000,000 person-rem. The potential health effects from L-Reactor operation are much less than one excess cancer fatality and much less than one genetic disorder for the entire population living within 80 kilometers of the Savannah River Plant. The pertinent sections of the EIS have been rewritten to clarify how the calculations of health effects were determined. To summarize, the potential health effects from L-Reactor operation are much less than one excess cancer fatality and much less than one genetic disorder for the entire population living within 80 kilometers of the Savannah River Plant.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
CT-2	The second point I would like to make is that in the alternatives discussed for the production of plutonium, weapons grade plutonium, one of the alternatives, that being using commercial waste from commercial reactors, is very quickly reviewed and dismissed. It is dismissed because the Atomic Energy Act states that you cannot use commercial waste to make weapons grade or use for military purposes, and therefore, with one sentence, you state in the EIS that this alternative is not feasible. The problems with that is you have spent two hundred-some-odd million dollars. We have rented a room, in four other different places, time and time again, and we have booklets, and we have people with all that money, and with President Reagan stating that, as a matter of policy, and I'm quoting now from Page S-1 of the EIS: "As a matter of policy, national security requirements, not arbitrary constraints on nuclear material availability, shall be the limiting factor in the nuclear force structure." It seems to me that, as a taxpayer, I would like to save my 200 million dollars, and I think that President Reagan's attitude would certainly help the DOE in simply amending the Atomic Energy Act so that you can in fact, use the commercial waste to make plutonium that you need. If you were able to do that, you would be able not to have the L-Reactor. You would not have any problems with cooling towers, you would have any questions about containment domes because you wouldn't be having a reactor. Instead, you would be taking the commercial waste that is being built up and that nobody has any idea what they are going to do with. You can take it straight from a commercial reactor, take it over to either Barnwell or take it to the L-Reactor chemical separator itself and go ahead and process it. You are going to have to cook it longer because you are going to have higher degree of Plutonium 240, but you can do it, and you can do it and save all this money, and all you have to do	See the response to comment BY-2 regarding the use of material from commercial reactors. Additional information on this subject has been added in this final EIS in Section 2.1.1.2.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	with one stroke of a pen is amend Atomic Energy Act, and bingo, you have got it. I think that alternative should be considered a lot more than it has been, and certainly should have been considered before the 200-some-odd million dollars was spent, and I believe the DOE should at least really look to its own lobbyists to try to get that act amended because that would solve everybody's problem. It would help the commercial people getting rid of their waste, and it would help us down here because we wouldn't have a reactor. It would just solve a lot of problems.	
CT-3	The last point is about the cooling tower. The cooling tower would take about 39 million dollars to build. You can build it now and also keep the L-Reactor on line and on time, and in the 18 months that it would take to build it, you could simply cut it in. Your own EIS states this is an alternative. You can build it and cut it in, and you won't lose any time or any plutonium because the L-Reactor would be on line. I think that is an alternative that everyone can live with. I think it's a good compromise. People down here get their cooling tower and the L-Reactor, and the DOE gets their plutonium, all at the same time, and I don't think 39 million dollars is all that much to spend, considering you have already spent 200 million dollars, and considering it's just a drop in the bucket of the deficit. So I think those three things, clarification of the cancer and deformity rates, genetic disorder rates, should be made clear in the permanent EIS, and I think the alternative of amending the Atomic Energy Act should be discussed a little further than it has been, and, thirdly, the alternative of the cooling tower being built and then being cut in while the L-Reactor is already on line, I think, it is a good alternative and should also be further discussed. Thank you.	See the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MR. SPRAGUE		
	My name is Larry Sprague, and I'm speaking for myself. There are several specific questions that I believe should be addressed or addressed more fully by the Environmental Impact Statement.	
CU-1	First off would be the dosage tables, particularly, that are found in Exhibit 4-25, and this is the dosage table that shows the amount of dose of radiation that people outside of the Savannah River Plant might receive. The EIS does not make clear how these figures were arrived at. For instance, were they historical measurements of radiation coming from the L-Reactor? Well, if this is so, then, from my reading of the EIS, it seems that the measuring instruments were on the perimeter of the plant site and therefore, the concentration of radiation would be very slight and very difficult to monitor or detect accurately. Furthermore, the measuring instrument was a thermoluminescent dosimeter, or TLD, for short, which is a relatively insensitive instrument for measuring some type of radiation. Therefore, the cumulative dosage could, in fact, be higher than the table indicates. Furthermore, what standards of maximum dosage will be used? The EIS indicates that the limits will be per DOE regulations. However, I would like to make two points on that. One, in the EIS nowhere are the DOE regulations set out, so the public can have an idea of what the difference is between the NRC regulation and the DOE regulation, and secondly, if the DOE regulations allow a higher dosage than those found in 10 CFR 50, why is that so? Why is it that the DOE deems it all right for the surrounding community to be subjected to this higher level of dosage on the DOE regulations than under 10 CFR 50?	Exhibit (Table) 4-25 in the Draft EIS presents the environmental risk from a hypothetical 10-percent core-melt accident. Section 4.2.1.5 presents the method of calculating this risk. These calculated values are the product of dose consequence and probability per year for the accident. Table 4-22 in the Draft EIS lists the offsite doses from credible accidents. These doses are less than the DOE standards for normal operations (DOE 5480.1a., Chapter 11), which are essentially the same as those used by NRC for regulating the nuclear power industry (10 CFR 20). The dose from a range of accidents is treated probabilistically and compared in Figure 4-11a of the Draft EIS with the NRC design goal for power reactors (10 CFR 100) of 25 rem at the site boundary. The offsite doses from L-Reactor operation (Table 4-19 in the Draft EIS) are based on the average releases of radioactivity for 1978, 1979, and 1980 for the operating C-, K-, and P-Reactors. The releases of radioactivity from these reactors are measured at the point of release to the environment. All radionuclides released are measured quantitatively by a system that includes continuous monitoring plus sampling and analysis in analytical laboratories. The environment is comprehensively monitored by a program described in Section 6.1 of the EIS. This program includes sampling and analysis of drinking water, rainwater, river water, food, fish, vegetation, animals, soil, etc. During normal operations, tritium is the only radionuclide of SRP origin that is detectable in environmental samples by routine monitoring techniques. Thus, it is necessary to calculate offsite doses by a model that accounts for movement of radioactivity in the environment and exposure of man by

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		known exposure pathways. This environmental dosimetry model is described in Appendix B of the EIS. The expected releases of radioactivity from L-Reactor given in Sections 4.1.2.1 and 4.1.2.2 was used to calculate the offsite doses shown in Table 4-19 of the Draft EIS.
CU-2	My second point has to do with the radiocesium found in Steel Creek. I understand that the original source of the cesium was from a leak in the primary cooling system to the secondary cooling system. I would like to see in the EIS what has been done to prevent a recurrence of this. In particular, I believe the following steps should be taken. First, a radiation detector should be put in the secondary cooling system to determine when, in fact, you do have a leak, and not only that, but it should indicate present radiation and shouldn't just be detecting cumulative amounts. Secondly, the secondary cooling system should be a closed loop with a demineralizer in it, so that in the event of a leak, the reactor can be operated for a while without the radiocesium being admitted into the environment. Third, a third loop in the cooling system should be added.	As discussed in Section 3.7.2.1 of the EIS, the primary source of radiocesium was leaking fuel elements stored in the disassembly basins in P- and L-Areas, not a leak in the primary cooling system. See Section 3.7.2.1 of the EIS concerning steps taken in the late 1960s and early 1970s to reduce further releases of radiocesium. Also see Sections 2.2.3 and G.3.1.5.3 of the EIS concerning radioactivity monitoring of the secondary cooling water discharged from the reactor heat exchangers. A closed second cooling loop with demineralizer or a third cooling loop is not necessary because the primary loop is continuously deionized and filtered and leakage between the primary and secondary loop is small. Leakage between the primary and secondary loops is continuously monitored and limited to a value that would result in a radiological release that is only a small fraction of acceptable release limits. Should this limit be exceeded, operating procedures require that the reactor be shut down and the heat exchanger be isolated to prevent further leakage. The radiological impact of leakage is a small fraction of the impact of total reactor wastewater discharges to the process sewer, which are well within acceptable limits.
CU-3	My third area of concern is metal fatigue of the reactor vessel. Radiation over a period of time can lead to metal fatigue in the area of the highest neutron influx in the reactor vessel. Now, this reactor vessel was actually in operation for about 12 years. I would like to see this question addressed: First, what is the effect that this has had on the strength of the reactor vessel; have any studies been done, and what are their conclusions; and if no studies have been done, why not?	The effects of neutron irradiation on the stainless steel SRP reactor vessels have been studied (<u>Extended Service Life of Savannah River Plant Reactors</u>, D. A. Ward, et al., DPST-80-539), and it has been concluded that no significant deleterious metallurgical effects have occurred. Furthermore, no future deleterious effects are expected because neutron fluence has been accumulating very slowly since operation with lithium-blanketed charges started in 1968. At the temperatures and

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		neutron fluences experienced by SRP reactors, yield strength and tensile strength increase; ductility and impact strength decline with increasing neutron fluence. The temperature of the SRP reactor tank walls is too low for significant swelling to occur from voids or gas bubbles resulting from neutron irradiation. In addition, experimental evidence has demonstrated that a relaxation of preirradiation stresses also results from fast neutron fluence. The reactor tanks are not expected to be affected by fatigue damage because the stresses encountered in the low-temperature, low-pressure system are well below endurance limits, and vibration from process-water circulation has been reduced to a low level.
CU-4	Lastly, I would like to take the DOE to task for the lateness of the Environmental Impact Statement. I realize this is somewhat futile, but it does upset me to see the whole purpose of the Environmental Impact Statement defeated. The whole purpose is for the federal government, before it spends huge sums of money, to take a look at all the facts and possibilities. Well, the government has already spent the money. It has already spent around 200 million dollars. What do we have? A plant that is supposed to produce plutonium, but it is not in operation. It hasn't produced one ounce. Part of the reason is because you haven't produced an EIS, but secondly, there are still serious questions raised about its safety, and these questions could have perhaps been answered, and the answers to these questions incorporated in the rebuilding of the L-Reactor and perhaps the L-Reactor would be in business today, or alternatives such as the Barnwell plant could have been chosen, and three years ago, it might have been possible to amend the Atomic Energy Act and thereby use the Barnwell plant. So, if instead of ramming the L-Reactor down our throats, the government had gone ahead and done an EIS, which was almost self-evident on its face that they had to, and the other alternatives looked at, the L-Reactor might have been made safer in the first instance, might be in operation now, because it was safer, and all these problems would have been taken care of and we wouldn't be under the time constraints we are now, or possibly a cheaper and safer alternative, such as the Barnwell plant, might have been possible. Thank you.	This EIS has been prepared in accordance with the Energy and Water Development Appropriations Act, 1984, and the National Environmental Policy Act of 1969, as amended. The potential environmental consequences of upgrading and renovating L-Reactor--as opposed to operating L-Reactor--were reviewed and determined to be insignificant.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF PAUL S. DRAPER, L. R. CASTILIAN, LOUISA GREEN, RANDY (CHILL), A. L. WEEKS, CHARLES H. RAWLINSON, THOMAS M. COMBS, STEVE HIERS, WILLIAM OLIVE, JOHN GRIFFIN AND CECIL PRYOR		
CV-1	It is our opinion that the L-Reactor should not be reactivated until further ecological studies have been made.	The EIS included comprehensive ecological information drawn from more than 100 documents developed over the past 30 years by recognized research organizations (the Savannah River Ecology Laboratory, the Savannah River Laboratory, the Academy of Natural Sciences of Philadelphia, the U.S. Geological Survey, and the University of South Carolina, among others). Extensive ecological studies, both onsite and offsite, are described in Sections 3.6, 4.1.1.2, 4.1.1.4, 4.4.2, 5.2.4, 5.2.5, Chapter 6, and Appendix C. For example, the Academy of Natural Sciences of Philadelphia has monitored the water quality and aquatic biota of the Savannah River for the past 30 years; also, an intensive comprehensive cooling-water study (Section 6.1.3) is monitoring water usage and quality, and wetland, fisheries, and endangered species impacts in Par Pond, the SRP onsite streams, the Savannah River swamp, and the Savannah River from Augusta downstream to near Savannah, Georgia. Section 7.3 of this EIS has been revised to reflect the current status of consultations with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
LETTER OF ARTHUR H. DEXTER		
	Rt. 1, Box 80A Aiken, S.C. 29801 November 4, 1983	
	Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Dept. of Energy Savannah River Operations Office P.O. Box A Aiken, S.C. 29801	
	Dear Mr. Sires:	
	I was disappointed to find that the Draft EIS had failed to treat, in a technically honest manner, the concerns that I raised in my letter of August 3, 1983. I offer the following additional comments:	
CW-1	1) The Draft EIS fails to cite the technological breakthrough that now permits the ultra-conservative assumption that core melting can be limited to 1% (or is it 3%?) of the fuel. During the several years that I was associated with these concerns, it was commonly assumed that fuel melting would be so extensive that the fuel would melt through the bottom of the reactor tank and come to rest in the pin room, i.e., the room immediately beneath the reactor. That scenario was obviously closer to 100% meltdown than to 1%.	See the responses to comments BL-2 and BL-4 regarding loss-of-coolant accidents.
CW-2	2) I find it curious that the Draft EIS chooses to ignore the research that A. G. Evans and I performed which shows that essentially 100% of radiiodine is released <u>in the volatile form</u> , from water in the presence of a background of ambient radiation. The Draft EIS contention, that the radiiodine would stay dissolved in the water, is completely at odds with these findings.	In analysis of loss-of-coolant accidents resulting in fuel damage, 50 percent of the iodine in the damaged fuel is assumed to become airborne within the process room (see Section 4.2.1.4). No credit is taken for condensation on various building structures and all of the airborne iodine is assumed to reach the carbon filters of the airborne activity confinement system. The remainder of the iodine would be contained in

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	It is interesting that while the EIS tries on the one hand to outdistance itself from commercial power reactors when matters pertaining to containment vessels are discussed, it is quick to cite TMI-2 results on radiiodine, (which may or may not have any application to SRP), in preference to in-house results! This matter of the volatility of the iodine, in the presence of ionizing radiation, is a very critical concern as regards the safety of CSRA residents. Obviously the framers of the EIS do not wish to acknowledge that radiiodine is released from the water since this would be an acknowledgment of the contentions of my letter and the inadequacies of present SRP measures for dealing with a meltdown accident.	the reactor, reactor building, moderator, or emergency cooling water. Moderator and emergency cooling water containing radioactivity would be retained in two tanks as discussed in Section 4.2.1.4. Only a small fraction of radiiodine in these tanks would be volatilized. The tanks as originally designed were vented to the atmosphere but were subsequently modified to vent back through the airborne activity confinement system so that no unfiltered radiiodine compounds would be released. The research referred to in the comment is applicable to volatilization of iodine from these tanks. The purpose of the research was to investigate the use of additives to prevent or retard volatilization of iodine from water in the presence of a radiation field. The results of their research were published (A. H. Dexter et al., 1977, "Iodine Evaporation from Irradiated Aqueous Solutions Containing Thiosulfate Additive," 14th ERDA Air Cleaning Conference) and do not support the statements made in this comment. The research showed that after exposure to 10^8 rads, 14.6 percent of the iodine was evaporated with no additives, some additives increased evaporation up to 96 percent while other additives were found to reduce evaporation to as low as 0.044 percent. After modifying the tanks to vent them to the confinement system, concerns regarding volatilization of iodine from the tanks were alleviated.
CW-3	3) I am frankly skeptical about the Draft EIS claim that SRP has developed impregnants that will permit the absorption of organic iodide compounds on carbon. If such is the case, then a major breakthrough of this kind should be extensively documented in the EIS.	Appendix B of the EIS describes the effectiveness of the impregnated carbon filters. The references listed in this appendix, especially the Safety Analysis Report (Du Pont, 1983), contain more details.
CW-4	4) While the Draft EIS fails to provide a technically honest treatment of the concerns raised in my previous letter, I suggest that the 50-million gallon basin is, in effect, a "smoking gun" in that its very existence is confirmation of the scenario that I cited in my letter: It is there to receive the huge volumes of radioactively contaminated cooling water that will flow to it during the aftermath of a meltdown. There is no other reason for the existence of this 50-million gallon basin. Lest anyone should experience difficulty in envisioning the volume of this huge	Section 4.2.1.4 describes the design functions of the 225,000-liter underground tank, the 190-million-liter emergency earthen basin, and the 1.9-million-liter tank in the earthen basin. This system was designed to contain radioactive materials resulting from accidents ranging from a spillage of the moderator to fuel melting. See the response to comment BL-4 for further discussion of loss-of-coolant accidents.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

basin, an equivalent basin could be created by excavating a regulation football playing field to a depth of 129 ft.

Sincerely,

Arthur H. Dexter

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF R. EILEEN BULLER		
October 27, 1983		
Mr. M.J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Dept. of Energy Savannah River Operations Office P.O. Box A Aiken, S.C. 29801 Re: DOE/EIS 01080 Dear Sir: I have completed reviewing the above EIS and wish to have my comments entered in the public record. Living on the edge of the Hanford Nuclear Reservation with its N-Reactor operations, I have developed some strong opinions about such facilities.		
CX-1	First, I believe that containment domes should be installed on all reactors. The possibility of accidental release is of great concern. To argue that such a containment is not cost effective ignores that well known fact (per Three Mile Island) that accidents do happen. All commercial reactors are required to have this design and it is reasonable to want military reactors to have the same.	See the response to comment BF-7 regarding containment domes.
CX-2	Secondly, the closed loop design with its direct discharge into rivers must be stopped. If it were not for the extensive lobbying efforts of two of Washington state's Senators long ago, the hot discharge into the Columbia would not have happened. I believe that this practice must be stopped.	See the responses to comments AA-1, BM-3, and CP-2 regarding cooling-water mitigation alternatives.
CX-3	Thirdly, these DOE managed facilities lack independent oversight when it comes to safety and health. It is imperative that our government restructure this inadequacy and apply independent oversight. The GAO Report on DOE managed facilities showed glaring mistakes at all facilities continually over the past years of operation. That report should be used as further	See the response to comment BQ-2 regarding existing oversight mechanisms. In DOE's comments on the GAO report (which had not been provided by GAO to DOE for review prior to publication), it was indicated that the "...GAO fundamentally misunderstood the

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
evidence that the public needs better protection and cannot rely on present DOE management to provide it.	philosophy of DOE's approach to safety and health, and failed to recognize the positive results of this approach." Also, "...many of the specific examples used to support GAO's recommendations were taken out of context, were inaccurate or reflected a misunderstanding of DOE's approach to its Safety and Health Program." These comments, which were provided to Congress on October 7, 1981, also identified the following points, which refute the GAO contentions:	- o Although not regulated by the Occupational Safety and Health Administration (OSHA), the DOE Health and Safety Program historically has resulted in a much better safety record for DOE facilities than the total OSHA-regulated industries or similar industries regulated by OSHA, such as the chemical industry. - o Having health and safety as a line management responsibility ensures clear lines of authority in implementing health and safety requirements, assures that health and safety is an integral part of each program and is properly considered in all phases of a program, assures that the greatest expertise on a specific program is brought to bear on health and safety matters, maximizes the sensitivity of all program personnel to health and safety requirements, and permits utilization of health and safety performance criteria in assessing and motivating program personnel. - o DOE provides an effective, independent health and safety overview function through the Assistant Secretary for Environmental Protection, Safety and Emergency Preparedness, who is a Presidential Appointee and who has no nuclear program management responsibilities. - o DOE, as part of its continuing internal efforts to improve and strengthen its Health and Safety programs had initiated modifications to improve its programs as a result of the internal evaluation published in March, 1981. This was not taken into consideration in the GAO report.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		o The GAO report failed to identify important disadvantages of potential NRC regulation of DOE facilities including the fact that NRC expertise is primarily with high-pressure light-water cooled reactors as opposed to the low-pressure, heavy-water production reactors at SRP for which the main expertise resides in DOE. In summary, the GAO report does not provide a balanced review of DOE Health and Safety programs, and the effectiveness of these programs relative to those regulated by such agencies as OSHA is demonstrated by the excellent safety record as compared to records for regulated industries engaged in similar activities.
	The thought of further contamination at Savannah River by bringing up the L-Reactor is most distressing. Although I live in Washington, I know how it feels to be at the whim of the DOE and its well-paid contractors. Past mistakes of handling waste, of leakers, of direct river contamination, of slowly moving plumes of tritium and other isotopes into the river and aquifers all evidence that this decision is incorrect. It is time to clean up 40 years' worth of enormous contamination, not to produce more waste. Reprocessing is a filthy process and the health and safety of all of us should be of paramount concern.	
CX-4	Finally, the need of the L-Reactor is in question. From my knowledge of new programs at Hanford such as the Laser Isotope Separation Process and the modification of the head-end of the PUREX plant, it appears that plutonium production is not being neglected and certainly does not need additional L-Reactor product.	See the response to comment AB-8 regarding need. Construction of a shear-leach head-end on the PUREX facility is discussed in this EIS in Section 1.1.2 and Appendix A.
CX-5	If tritium is needed, and I doubt we need any plutonium bombs at all, then use the N-Reactor. These pro-nuclear advocates at Hanford would delight in that thought, as their built-in pork barrel would be guaranteed. By doing this, the N-Reactor's life would be shortened much to my delight.	The need and production of tritium is outside the scope of this EIS. The purpose of the L-Reactor restart is the production of plutonium.
	Yours truly,	
	R. Eileen Buller, 1703 West 15th Ave., Kennewick, WA 99336	

M-248

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MAXINE M. WARSHAUER		
	3526 Boundbrook Lane Columbia, S.C. 29206 Nov. 1, 1983	
	Mr. Melvin J. Sires, III U.S.D.O.E. S.R. Operations Office P.O. Box A Aiken, S.C. 29801	
	Dear Mr. Sires:	
CY-1	I would like to submit a personal comment for the Environmental Impact Statement concerning the L-Reactor at SRP. As a South Carolina resident, I am concerned with the effects of re-starting the L-Reactor. I understand that the water to be discharged into Steel Creek is hotter than state safety regulations allow. Flushing cesium into the Savannah River would contaminate drinking water downstream. Furthermore the seepage basins would leak more toxic chemicals into the Tuscaloosa aquifer. And high-level toxic wastes produced at SRP would be raised by 33%.	See the response to comment AA-1 regarding cooling-water mitigation alternatives, the response to comment AA-2 regarding the relationship of radiocesium and radiocobalt concentrations to EPA standards, and the response to comment AJ-1 regarding ground-water and seepage basins.
	I am opposed to re-starting the L-Reactor until these environmental hazards can be effectively neutralized.	
	Yours truly,	
	Maxine M. Warshauer	

M-249

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

STATEMENT OF FRANK VON HIPPEL

Princeton University School of Engineering/Applied Science
Center for Energy and Environmental Studies
The Engineering Quadrangle
Princeton, New Jersey 08544
Phone (609) 452-5445

October 31, 1983

Mr. M. J. Sires, III
Assistant Manager for Health,
Safety and Environment
US Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, SC 29801

Dear Mr. Sires,

Please find attached my comments on the Draft Environmental
Impact Statement, L-Reactor Operation, Savannah River Plant
(DOE/EIS-0108D).

Sincerely yours,

Frank von Hippel

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
November 1, 1983		
<u>Comments on the Department of Energy's Draft Environmental Impact Statement on L-Reactor Operation, Savannah River Plant (DOE/EIS-01080)</u>		
Frank von Hippel Princeton University		
<u>Summary</u>		
Because of time constraints, these comments are limited to the treatment in the Draft EIS of:		
- o the risk from reactor accidents, and - o the need for additional weapons-plutonium.		
M-251	CZ-1	With regard to the risk from reactor accidents, the final EIS should include an estimate of the consequences of a full-core meltdown followed by a failure of the radioactive gas filtration system. Accidents of this severity are routinely considered in the Nuclear Regulatory Commission's (NRC) risk analyses for civilian power reactors. The DOE's belief that such catastrophic accidents are impossible at the L-Reactor may be due to the apparent neglect of common-mode failures in its accident probability estimates. Since, in any case, such probability estimates are known to be unreliable as predictors of the likelihood of catastrophic accidents at nuclear reactors, the DOE's risk assessment should focus principally on the degree of "defense-in-depth" designed into the L-Reactor's safety systems. From this perspective, the lack of a passive containment building, a standard safety feature of all US civilian power reactors, must be a source of serious concern. As discussed in Section 4.2.1.3, the airborne activity confinement system is assumed to operate for all accidents considered because of its high reliability and the extremely low probability of a concurrent accident and system failure. Section 4.2.1.4 of this final EIS has been modified to present the basis for the probability criteria used to select accidents for further analysis including those caused by common mode failures. Since startup of SRP reactors, a continued effort has been devoted to the review of the effectiveness of reactor safety systems and upgrading of systems. These reviews have included analysis of what has come to be known as "common cause" failures as noted in the response to comment BL-9.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
CZ-2	With regard to the need for the L-Reactor plutonium, the unclassified discussion offered in the Draft EIS is unnecessarily vague. Essential information has been omitted despite the fact that this information has previously been made public or is easily derivable from public information. Such information, which should appear and be discussed in the final EIS includes: the approximate amount of plutonium already in the US nuclear weapons stockpile, the approximate plutonium production rate of the L-Reactor, and the amount of plutonium in the Nagasaki bomb. The reader of the unclassified EIS would learn from these three numbers that the plutonium already in the US nuclear weapons stockpile is sufficient to make at least 20,000 nuclear warheads and that the L-Reactor would increase this stockpile by only about 0.4 percent a year. These facts are certainly relevant to the L-Reactor restart decision and indeed make implausible assertions that plutonium shortages could delay the deployment of any high-priority US nuclear weapon systems. To further clarify the matter, the DOE should include in the final EIS a list of the weapons systems which it believes would be delayed if the restart of the L-Reactor were postponed or cancelled.	DOE has focused on the degree of "defense-in-depth" designed into the L-Reactor safety systems by describing these systems and accident experience and analysis in this EIS. Concerns regarding a passive containment building for the L-Reactor are addressed in Section 4.4.1 of this EIS as well as in its detailed description of the benefits of the alternate confinement system in Section 4.2.1. Also see the responses to comments BF-6, BF-7 and BL-11 concerning the adequacy of the L-Reactor confinement system. See the response to comment AB-2 regarding information in this EIS on need and production alternatives. The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>Reactor Accident Consequences</u>		
	People living near the Savannah River plant are entitled to know the potential consequences of a worst-case accident at the L-Reactor. Furthermore, frankness and honesty about this possibility is likely to be in the long-term interests of the government. The traditional AEC-ERDA-DOE public-relations approach to concerns about reactor safety has not done civilian nuclear power any good in the past and is unlikely to do the nuclear weapons production complex any good in the future. More often than not, such a policy seems to backfire and convinces concerned citizens that the risks are <u>greater</u> than they really are.	
CZ-3	The worst-case accident at the L-Reactor would be a full core meltdown with the radioactive gases driven off by the core escaping unfiltered to the human environment. Although the DOE may believe that such an accident has a negligible probability, it is well-known that such probability estimates are unreliable.	See the response to comment CZ-1 and the response to comment BL-12 regarding probability estimates.
CZ-4	The unreliability of estimates of the probabilities of catastrophic nuclear reactor accidents became clear as a result of the many review of the Nuclear Regulatory Commission's <u>Reactor Safety Study (RSS)</u> . This study included estimates of the probabilities of catastrophic accidents at two civilian nuclear power plants. The work underlying these estimates was both much more sophisticated and more complete than the L-Reactor risk assessment described in the Draft EIS. Nevertheless, following a prolonged debate and a commissioned outside review by a group on which I served, the NRC concluded in 1979 that "the Commission does not regard as reliable the Reactor Safety Study's numerical estimate of the overall risk of reactor accident." [NRC Press Release, January 18, 1979.]	The probability estimates for the L-Reactor are not derived from those developed for the Reactor Safety Study, WASH-1400, although the basic methodology is similar. However, it should be noted that the Risk Assessment Review Group found in part: "o Despite its shortcomings, WASH-1400 provides at this time the most complete single picture of accident probabilities associated with nuclear reactors." And, "o The Commission accepts the Review Group Report's conclusion that absolute values of the risks presented by WASH-1400 should not be used uncritically...." DOE has not used the probability estimates uncritically.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
CZ-5	A measure of the incompleteness of the L-Reactor risk assessment is the fact that it does not even include accident scenarios which could lead to a full core meltdown with failure of the radioactive gas filtration system. In the <u>RSS</u> , such catastrophic accidents were estimated to have a much higher probability (30 times higher for a pressurized water reactor) than the probability given in the Draft EIS for the most severe L-Reactor accident considered there (a relatively benign event involving the melting of only 3 percent of the core with the radioactive gas filtration system effectively preventing a large release of radioactivity to the atmosphere - see Table S-2 of the Draft EIS). Although the probability estimates in both reports must be considered unreliable, the absence in the L-Reactor risk analysis of an accident sequence which would lead to a catastrophic release requires explanation.	See the responses to comments BL-1, BL-2, BL-4, CZ-1, and CZ-4 regarding consideration of a full core meltdown.
CZ-6	The most likely explanation for the missing catastrophic accidents in the L-Reactor risk assessment is not the relative safety of the L-Reactor design - which after all does not even have the passive radioactive gas containment building required at all civilian reactors - but the apparent neglect in the L-Reactor risk assessment of "common-mode" safety system failures. This is the class of failures which would include accident sequences which would simultaneously incapacitate all the L-Reactor emergency cooling systems and the radioactive gas filtration system. It is well-known, from both the RSS and accident experiences such as those at Brown's Ferry and Three Mile Island, that common-mode failures are the most likely cause of catastrophic reactor accidents. A severe earthquake; errors in design, construction or maintenance; and sabotage are only some of the many potential causes of such common-mode failures which should have been considered.	See the response to comment CZ-1, and the responses to comments BL-9 and BL-12 regarding "common mode" failures.
CZ-7	In any case, in the final EIS, the DOE should discuss the consequences of a core melt-down at the L-Reactor with subsequent bypass or failure of the radioactive gas filtration system. As I show below, the seriousness of such accidents can be estimated from results obtained by the RSS.	See the response to comment CZ-1.
CZ-8	For simplicity, I will consider below only radiation doses at a distance 12 km (7.5 miles) downwind from a worst-case L-Reactor	It is not reasonable to apply the results of the Reactor Safety Study to L-Reactor because of the significant differences in

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	accident. This is the average distance from the L-Reactor to that part of the site boundary which lies to the south of the reactor (see Fig. 3-2 of the Draft EIS). According to Table B-1 of the Draft EIS, the wind blows in these directions approximately one half the time. The predictions of the Reactor Safety Study whole-body and thyroid doses as functions of downwind distance may be found in the NRC report, <u>Examination of Offsite Radiological Emergency Protective Measures for Nuclear Reactor Accidents Involving Core Melt</u> (NUREG/CR-1131, 1978). It is reasonable to compare these results directly to those in the Draft EIS because the thermal power of the pressurized water reactor considered in the Reactor Safety Study (3200 MWt) is approximately the same as that assumed by the DOE in calculating the consequences of L-Reactor accidents (3000 MWt, according to Table S-2 of the Draft EIS). The accumulation of long-lived fission products in the L-Reactor core is somewhat lower than in a power reactor, but, as is shown in Fig. VI 13-1 of the RSS, the most important contributors to the 2-hour offsite dose are short-lived isotopes which would be present in comparable amounts of the two reactors. (The radioactive inventory assumed for the L-Reactor core is given in Table G-10 of the Draft EIS. That assumed for the pressurized-water power reactor considered in the RSS, is given in Table VI 3-1 of that report.)	design. See the response to comment BF-7 regarding these differences.
CZ-9	Given a 10 mph wind and a 3 hour delay before evacuation, the RSS calculated a "mean projected whole body dose" outdoors, 12 km downwind from a core-melt-containment-failure accident of approximately 10 rems. (See curve E of Figure 5.9 of NUREG-CR-1131.) The corresponding thyroid dose was estimated to be about 1000 rems (ibid, Fig. 5.12). These numbers are respectively 25 and 2000 times higher than the largest values shown in Table S-2 of the Draft EIS for the 2-hour whole-body and thyroid doses. Doses of this magnitude would not be associated with a large risk of early death from radiation illness, but they would bring with them a significant increase	Based on the doses presented in the comment from a catastrophic accident, the individual so exposed to 10 rems would suffer an average increase in likelihood of death from cancer from about one in five to about 1.01 in five, equivalent to the risk from smoking 1/2 a cigarette per week for 30 years, hardly a "significant increase in cancer risk over the longer term." Similarly, a 1000 rem thyroid dose would yield a total risk of thyroid malignancy in the order of one in 250, with a negligible risk of fatality, a comparatively low consequence of a very low probability accident categorized as "catastrophic."

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
M-256	CZ-10	in cancer risk over the longer term. Furthermore, if evacuation were delayed or the meteorological conditions were adverse, whole-body doses could rise above the levels (200-300 rads) where fatalities from radiation illness would begin to occur [NUREG/CR-1131, Figs. 5.10 and 5.22].
	Land contamination from atmospheric releases of radioactivity on the scale of the worst accidents considered in the <u>Reactor Safety Study</u> would also be much more severe than for those accidents considered in the Draft EIS. For example, the <u>RSS</u> estimated that, even if techniques existed which could be used to reduce the radioactive contamination of thousands of square miles by 95 percent, residents would typically have to vacate for years areas up to 30 miles downwind from a core-meltdown-containment-failure accident [WASH-1400, Fig. VI 13-27]. In the absence of such effective decontamination techniques, this interdicted area would extend about 100 miles downwind.*	The waste storage tanks are equipped with cooling coils which are supplied with water from a closed-loop cooling system, which in turn, is cooled by heat exchangers supplied with well water. Loss of cooling in a waste tank containing fresh high-heat waste, a tank with a maximum rate of heat generation, would cause the temperature of the waste to increase to the boiling point over a period of about a week unless corrective action were taken. The maximum sludge and supernate temperature for each waste storage tank is recorded daily so that adequate time would be available to identify a cooling deficiency and to restore full cooling or to initiate supplementary cooling to avoid overheating. In addition to backup cooling water supply, each cooled waste tank is provided with a condenser as a backup for its cooling coils.
All these consequences should be carefully discussed in the final EIS.		There is presently no known accident that would occur at L-Reactor and cause a concurrent failure of the waste tank cooling system. In addition, the distance to the waste tanks from L-Reactor are sufficiently far that access and all necessary maintenance to the waste tanks would continue to be performed in the unlikely event of an accident at L-Reactor.
*See also Jan Beyea and Frank von Hippel, "Containment of a Reactor Meltdown, <u>Bulletin of the Atomic Scientists</u>, August/September 1982, p. 52.		
**See <u>Waste Management Operations, Savannah River Plant</u>, (ERDA, Draft Environmental Impact Statement, ERDA-1537, 1976), pp. 111-96 and 111-97 for a suggestive although incomplete discussion of the problem of loss-of-cooling in Savannah River high level waste storage tanks.		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>The Urgency of Additional Plutonium Production for Weapons</u>		
CZ-11	Although the reactor accident risk assessment in the Draft EIS is obviously inadequate, it is at least accessible for independent peer review and will hopefully be improved as a result. In the case of the claimed need for the L-Reactor plutonium, however, the DOE appears to have used the excuse of classified information to avoid a public critique of its analysis. As will be shown below, it was unnecessary for the DOE to adopt this position. The principal numbers required to judge the need for the L-Reactor plutonium are in the public domain. Furthermore, these numbers tend to cast doubt on any claims of urgency for the restart of the L-Reactor. One can easily estimate, for example, from the published numbers for the quantities of Strontium-90 and Cesium-137 in the accumulated radioactive wastes at the DOE's Savannah River and Hanford sites, how much U-235 was fissioned in the AEC-ERDA-DOE production reactors and therefore how much plutonium these reactors produced. If one does this, one arrives at an estimate of approximately 120,000 kilograms of plutonium in the U.S. nuclear weapons stockpile. One can also easily calculate from the 2350 MWt nominal thermal power of the L-Reactor given in Table G-5 of the Draft EIS that it will be able to produce about 500 kg of weapon-grade plutonium per year - or approximately 0.4 percent of what the U.S. already has in its weapons inventory. Finally, we know from a declassified memorandum from General Groves (dated 18 July 1945) to the then Secretary of War, that the nuclear bomb which destroyed Nagasaki contained approximately 6 kg. of plutonium. This means that, even in the absence of the advances in nuclear weapons technology since 1945,	See the response to comment AB-2 regarding information in this EIS on need and production alternatives. The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

the amount of plutonium currently in the U.S. weapons stockpile would be sufficient to make 20,000 Nagasaki weapons.* The explosive yield of these weapons could, of course, be enormously increased by using them to trigger a second stage thermonuclear reaction.

The bare facts above by themselves make implausible that the lack of future plutonium production from the L-Reactor would delay any high priority U.S. nuclear weapons system. The DOE could, however, further clarify the issue by including in the final EIS a list of the weapons systems which it believes would be delayed if the restart of the L-Reactor were postponed or cancelled.

Conclusion

As a result of the review documented above, I conclude that the DOE has not provided in the Draft EIS an analysis of the quality which should be required for a federal action as significant as the L-Reactor restart decision.

*The U.S. also has in its nuclear weapons stockpile sufficient highly enriched uranium to make additional tens of thousands of nuclear warheads. The detailed documentation of this fact, along with the estimates given above for the U.S. weapons-

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION IV 345 COURTLAND STREET ATLANTA, GEORGIA 30365 November 4, 1983	
	4PM-EA/GM	
	Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, S.C. 29801	
	Dear Mr. Sires:	
	In accordance with Section 309 of the Clean Air Act and the National Environmental Policy Act, the Environmental Protection Agency has reviewed the Draft Environmental Impact Statement, and appendices, on the proposed resumption of L-Reactor operation at the Savannah River Plant (Barnwell County) South Carolina. Our evaluation reveals that there are a number of significant environmental issues resulting from this action which remain unresolved or are still under study in an effort to effect mitigation. The major issues are groundwater contamination associated with certain of the reactor's support facilities, discharge of heated effluent into Steel Creek which will result in the destruction of extensive wetlands within the creek and its delta with the Savannah River, and uncertainty involving the treatment and disposal of various potential and actual hazardous wastes generated from reactor operations.	
	The enclosed comments address all the issues which we have determined or suggest require additional assessment in the Final EIS. Nevertheless, the information in the document, coupled with our extensive dialogue with your staff members and this agency's long-term association with the Savannah River Plant,	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	allow us to make a reasoned decision on the proposal's overall environmental acceptability. On the basis of the outstanding water quality issues, a rating of EU-2 was assigned. That is, we have determined important ground and surface water impacts resulting from the facility's operation will be environmentally unsatisfactory in its currently proposed design in that the document does not provide sufficient information regarding the corrective measures that will be employed to avoid adverse environmental impacts. We know that the DOE is presently working on developing these measures, in cooperation with the regulatory agencies. We believe that much of the additional information that we have requested is already available to you and should be included in the Final EIS. If we can be of any assistance to you on this matter or you wish to discuss any of our observations/suggestions, Howard D. Zeller (FTS 257-3476) will serve as our point of contact. Sincerely yours, Charles R. Jeter Regional Administrator Enclosure	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
L-REACTOR SAVANNAH RIVER PLANT <u>GENERAL OBSERVATIONS AND SPECIFIC COMMENTS</u>		
DA-1	- o The Draft EIS describes the major environmental effects of the project. However, the final EIS could be improved by the inclusion of a more complete description of the deficiencies in the present reactor and attendant support system, and indicating what will be done to correct these conditions. A survey of the projected improvements and new items required for the overall facility to meet air and water quality standards reveals the shortcomings of the present system. It also reveals certain of the cleanup items that are necessary to meet requirements of the Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response Compensation and Liability Act (CERCLA), or DOE equivalent standards. - o Most of the improvements necessary to meet the desired standards are adequately described in Chapter 5, "Incremental, and Cumulative Impacts from L-Reactor Operation." However, we suggest that they be summarized in the first chapter, "Summary." Individual detailed coverage could then be given under "Environmental Consequences" in each of the chapters covering items which need mitigation or improvement. The major items in this regard involve addressing surface water discharges of certain contaminants, mitigation of thermal discharges, and better techniques for handling of hazardous materials. A clean-up/monitoring plan, to assess the present zone of contamination, is of special interest. Particular care must also be taken in regard to potential/actual groundwater supplies in those areas already determined to be contaminated or anticipated to become so. - o The Draft EIS contains a summary of projects which are being planned or are underway to correct the major deficiencies noted above. These facilities/cleanup measures are vital to any restart effort since they are necessary for the safe operation of the plant and subsequent attainment of air and water quality standards. This should be made clear in the Final EIS.	All applicable Federal and state requirements for air and water quality will be met by L-Reactor, including NPOES permit conditions. In this final EIS, an expanded discussion of cooling-water mitigation alternatives and the SRP groundwater protection and remedial action programs have been included. Pursuant to the suggestions contained in these comments, the summary to Volume I of this EIS identifies the mitigative actions to be taken by DOE, as well as the commitments with respect to other environmental protection programs.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-2	o The Draft EIS fails to address the impact on the groundwater system from the increase in effluent and waste volumes which will be generated at supporting facilities when the L-Reactor restarts. The report does state (Table 2-2) that there will be a 33% increase in effluent volume at the Fuel Fabrication Facility and at the Chemical Processing Facility, together with a 33% increase in waste volume to the Waste Management Facility. Yet, the Draft EIS omits any further discussion of the implications of the increased volume on the planned remedial actions. It also fails to develop alternative strategies to deal with the additional material. Development of alternatives to deal with this issue was one of the essential suggestions EPA made in its previous coordination efforts on this facility. These options need to be included in the Final EIS.	The EIS contains discussions of potential impacts to the ground waters beneath the SRP from the operation of L-Reactor and its support facilities (Sections 4.1.1.3, 4.1.2.2, 4.3.3, 5.1.1.2, and 5.1.1.4). These sections have been expanded to provide a more thorough discussion of groundwater impacts. As noted in the EIS, the incremental impacts to the shallow aquifers beneath the central shops, burial ground, and M-, F-, H-, and K-Area basins, and impacts beneath L-Area are expected to be minor. Alternatives to the use of the L-Reactor seepage basin are discussed in Section 4.4.3. Use of seepage basins elsewhere on SRP and the use of the SRP burial ground are all being evaluated on a sitewide basis. These facilities were used when L- and R-Reactors were operating. The incremental effects of L-Reactor operation are not likely to appreciably affect planned remedial actions. Alternative strategies to deal with the incremental releases of liquid wastewater and low-level radioactive wastes are discussed in the "SRP Ground-Water Protection Implementation Plan." This plan has been reviewed by the State of South Carolina and EPA and is currently being revised based on their comments. This plan will be the subject of a separate NEPA review (Section F.6). The DOE's commitment to the protection of ground-water quality are discussed below. As noted in the opening remarks to the public hearings on the L-Reactor DEIS, the DOE is committed to (1) an expanded program of sitewide ground-water monitoring and study; (2) the involvement of the State of South Carolina in onsite and offsite ground-water monitoring activities; and (3) mitigative actions at SRP to reduce pollutants released to the ground water as needed. Additional details are provided in Sections 6.1.6 and F.6 of this EIS. Current plans call for discontinuing the use of the M-Area seepage basin before April 1985 and operating a process wastewater-treatment facility at that time. Based on Congressional authorization and approval of a FY 1986 funding request, DOE plans to operate an effluent treatment facility by October 1988 to process wastewater and discontinue the use of the F- and H-Area seepage basins (Section 5.1.1.2).

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-3	o According to DOE's "Groundwater Protection Implementation Plan," the proposed restart comes at a critical stage in the management of SRP's groundwater problem. Three facilities, Fuel Fabrications, Chemical Processing and Waste Management, are scheduled for decommissioning in the near future since they have been responsible for significant groundwater contamination.	As mentioned in response to comment DA-2, the "SRP Groundwater Protection Implementation Plan" was recently developed to examine strategies and schedules to implement mitigative actions required to protect the quality of the groundwaters beneath SRP. Implementation of mitigative actions would be accomplished under DOE's Resource Conservation and Recovery Act requirements, and would be compatible with the State of South Carolina's hazardous waste management requirements. The small incremental discharges due to L-Reactor restart will be accounted for in the design of effluent treatment facilities that will replace existing seepage basins. The sitewide ground-water protection plan will be the subject of a separate NEPA review (Section F.6). This NEPA review on the ground-water protection plan will cover such topics as seepage basin decommissioning, cleanup levels, costs and schedules, and need for institutional controls.
M-263 DA-4	To comply with the Congressional mandate, the Fuel Fabrication Facility basin will be closed out by June 1985. At that time, wastewater will be routed to a wastewater treatment unit. At present, the seepage basin which receives effluent from the Fuel Fabrication Area is impermeable to downward percolation. This results in effluent overflows in a southwesterly direction to a lake down gradient. Severe contamination in the upper aquifer poses an imminent threat to a deeper aquifer that supplies drinking water to plant employees and off-site communities. Even though this could only be a short-term situation, the potential health and safety implications should be addressed in the Final EIS.	Pollutants, principally chlorinated hydrocarbons used as degreasers, that were released to the M-Area basin, leaked from the process sewer, and spilled from the M-Area solvent tank in the early 1960's, have migrated into the Tertiary sediments. This contamination is discussed in Sections 5.1.1.2. The sewer line to Tims Branch no longer receives process wastewater and the line to the M-Area basin has been repaired; discharges to the M-Area basin will be discontinued by April 1985. Although seepage basins have been in service at SRP since the mid-1950s, drinking water from the Tuscaloosa wells in the central portion of the SRP does not appear to be contaminated by radionuclides or chlorinated hydrocarbons. However, in 1983, two wells producing from the Tuscaloosa in A-Area were found to have low concentrations of chlorinated hydrocarbons; concentrations in water samples from these wells ranged from less than 3 to less than 27 micrograms per liter. Based on recent investigations by Geraghty & Millier (1983) the following findings have been made with respect to the entry of chlorinated hydrocarbons into the Tuscaloosa Aquifer: "The presence of trichloroethylene in well 53-A indicates that contaminants most likely are migrating from the shallower Tertiary zone downward along the outside of the well

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		casing into the gravel pack outside of the well screen section. The contaminants appear to enter the well in the upper part of the screened section between approximately 400 and 500 feet bis. An alternate interpretation considered is that the contamination is entering the well from the upper Tuscaloosa itself. However, this zone is free of contamination only 250 feet away, as shown by the analyses of water samples from monitor wells MSB-34 TA and TB." Public health and safety will be protected by the extensive monitoring program and plume management and remedial action strategy that is planned for M-Area. When monitoring first confirmed the presence of chlorinated hydrocarbons in water from A-Area Tuscaloosa wells, the contaminated wells were shut down to protect onsite personnel. The monitoring in A- and M-Areas and neighboring municipal water wells has shown that the contaminants have not migrated offsite and that no offsite health risk will exist in the foreseeable future. The M-Area ground-water remedial action project, scheduled for implementation in August 1984, is being designed to prevent chlorinated hydrocarbons from reaching the Tuscaloosa Aquifer and any offsite well producing from the Tertiary ground-water system (Steele, 1983). The remedial program will arrest further migration of the present contaminant plume in the Tertiary ground-water system. State and Federal agencies are reviewing plans for impeding the growth of the contaminant plume and the removal of the chlorinated hydrocarbons using a combination of recovery wells, and a large air-stripper with a capacity of at least 9 times the incremental discharges to the M-Area seepage basin. Pilot and prototype air-strippers are currently operating in M-Area with capacities of 0.075 and 0.18 cubic meter per minute, respectively. In addition, the health of onsite personnel will be protected by changes in the water distribution system, which will obtain potable water only from the A-Area Tuscaloosa wells, which are unlikely to receive contamination from Tertiary aquifers. DOE has recently conducted a workshop to discuss and review the M-Area remedial action program. Participants included the EPA, SCDHEC, SC Water Resources Commission, USGS, DuPont, and Geraghty & Millier. All agreed that the planned program is sound technically.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-5	Decommissioning of the Chemical Processing Facility basins is planned for late 1988. The effluent will then be routed to a wastewater treatment unit, with subsequent discharge to surface water. The present effluent, which is discharged to seepage basins, meets the definition of a hazardous waste based on pH and chromium. Groundwater in the area has been contaminated by both of these constituents, as well as radionuclides. As a result of seepage, surface streams and adjacent wetlands are receiving contaminated discharge from the groundwater system. Any additional discharge volume (i.e., the 33% additional volume from L-Reactor operation) can only contribute to the existing problem. Again, the health and safety implications of this issue need to be addressed in the Final EIS.	The L-Reactor incremental releases to the M-Area seepage basin are currently projected to be 0.16 cubic meter per minute; they are expected to be substantially smaller by the end of 1984. The incremental releases will not contaminate the groundwater within the Tuscaloosa Formation, nor will drawdown of the Tuscaloosa Formation by pumping in A-Area increase the movement from the seepage basin and Lost Lake areas to the watertable. The A- and M-Area ground-water remedial action project is scheduled to be operating by August 1984. The recovery wells will intercept seepage from the M-Area seepage basin and Lost Lake areas when it reaches the water table in about 10 to 17 years. Use of the M-Area seepage basin is scheduled to be discontinued by April 1985, when a wastewater treatment facility will be in service. Additional details are provided in Section 5.1.1.2, which has been expanded. The amount of mercury and chromium released to the Separations Areas seepage basins has decreased since the early and mid-1970's. Before 1972, approximately 7.9 and 9.4 kilograms of mercury were released per reactor to the F- and H-Area basins, respectively. More recently, the average contribution per reactor has been about 0.7 and 2.1 kilograms, respectively. Releases of mercury to these basins is currently 0.5 and 8.0 kilograms per reactor. The addition of a second evaporator to process radioactive waste in the H-Area waste tanks has caused a small increase in the amount of mercury added to the H-Area seepage basin since mid-1982. In 1975 approximately 120 and 2310 kilograms of chromium were discharged to the F- and H-Area seepage basins respectively. The discharge of chromium to the H-Area seepage basin since 1982 was principally due to the processing of radioactive waste produced prior to 1982. After processing by the waste evaporator, the concentrated fractions are sent to the high-level radioactive waste storage tanks. Newly generated chromium that comes from the RBOF facility, which processes offsite fuels and removes oxide from onsite target assemblies, is processed through a waste evaporator. This process step greatly reduces the amount of chromium released to the H-Area seepage basins. Incremental releases of chromium to the H-Area seepage basin from SRP reactor support operations are currently about 0.2 kilogram per year per reactor and are not expected to be hazardous.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		On an annual average basis the releases of mercury and chromium to the F- and H-Area seepage basins are expected to remain at levels below those considered hazardous. Weekly composite analyses showed that the influent streams to these seepage basins were not hazardous with respect to mercury and chromium in 1982 (J.D. Spencer letter to G.A. Smithwick of 13 May 1983); these waste streams could be frequently classified as hazardous on the basis of low pH. In 1983, however, the waste streams to the H-Area basins exceed the hazardous limits of mercury and chromium about 10 percent of the time. Most of the chromium entering the basin is related to the processing of non-SRP fuel elements. In 1983 mercury exceeded the 200 microgram per liter hazardous limit in 6 weekly composite samples, reaching a maximum of 640 micrograms per liter. The source of mercury to the basins is waste tank evaporator overheads. Although more mercury will go to tanks as a result of L-Reactor restart, discharges of mercury should not increase significantly. Also, fewer exceedances of the mercury limit are expected because the amount of mercury being released has been reduced.
		The continued use of the F- and H-Area seepage basins is being evaluated on a sitewide basis (Section 6.1.6, and F.6 of the FEIS). Waste treatment facilities for the F- and H-Areas are being studied and bench scale demonstrations are being performed. The draft SRP Groundwater Protection Implementation Plan discusses the schedule for completion of the waste treatment facilities in the Separations Areas (October 1988) provided Congressional authorization and appropriation is obtained.
		The L-Reactor incremental releases to the Separations Areas seepage basins are projected to be 0.04 cubic meters per minute and 0.09 cubic meters per minute to the F-Area and H-Area seepage basins, respectively. The incremental releases are expected to increase the concentrations of constituents in the contaminant plume by about 7 percent. The water quality of Four Mile Creek will be impacted as the ground water flows into the creek through seepage springs in lowlying wetland areas. Concentrations of constituents in the creek water will be increased by about 7 percent. However, drinking water standards are not expected to be exceeded, and the quality of the creek water is expected to be similar to that of the Savannah River below the outfall of C-Reactor. Radioactive constituents will meet DOE criteria for releases to uncontrolled areas when Four Mile Creek flows into the Savannah River. The direction of

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-6	The draft "Groundwater Protection Implementation Plan" proposes to decommission the Low Level Waste Burial Ground in the late 1990's; however, EPA has requested that the decommissioning and alternate disposal plan be expedited. The present practice of disposing of low level radioactive waste, in combination with chemical waste, into trenches in the ground does not represent state-of-the-art technology and may violate RCRA requirements. To increase the volume of waste which must be handled by this facility before the decommissioning plan has been developed, is out of logical phasing. Practically speaking, SRP needs to develop a proper disposal facility to handle the present volumes of waste materials before any additional waste is generated. Impacts on the groundwater system from the discharge of contaminated water from the disassembly basin to a seepage basin located near the L-Reactor, have been discussed in the Draft EIS. Wastewater discharged to this basin is primarily contaminated with radionuclides which contaminate the upper aquifer and eventually discharge to Steel Creek. Alternatives to seepage basin disposal were discussed and evaluated in the EIS, with the subsequent conclusion that seepage basin disposal is the preferred alternative. As stated before, seepage basins do not represent state-of-the-art disposal technology and may violate RCRA requirements. Every attempt should be made to develop an appropriate alternative to replace the seepage basin, or to improve	ground-water flow and the ground-water islands make it highly unlikely that any contaminated shallow ground water will reach offsite ground-water users (Du Pont, 1983; DPST-83-829). Beneath the central portion of SRP, the predominant flow directions in the Congaree and Tuscaloosa are toward the Savannah River; these formations discharge to the Savannah River. Also see the responses to comments DA-2 and DA-4. SRP operating procedures do not allow hazardous wastes to be disposed of at the SRP burial ground. An implementation plan is being developed at SRP to assure compliance with DOE requirements (DOE Order 5480.2) for the management of hazardous and radioactive mixed waste. A groundwater protection plan and a RCRA program management plan have been formulated by DOE for SRP. Research programs at SRP are investigating new methods for immobilizing and improving methods of low-level radioactive waste disposal at SRP. These programs include (1) wastewater treatment processes; (2) beta-gamma waste incineration; (3) immobilization and stabilization of waste in cement grouts (saltcrete and ashcrete); and (4) greater confinement disposal technologies. Effluents discharged to F-, H-, and M-Area seepage basins frequently meet the definition of hazardous waste because of low pH. Typically, these waste streams can contain 1,1,1-trichloroethane (M-Area), chromium (H-Area), and mercury (F- and H-Areas). In 1982 the concentrations of these substances were below levels considered to be hazardous (J. D. Spencer letter to G. A. Smithwick dated May 13, 1983). However, in 1983 the waste streams to the H-Area seepage basin exceeded the hazardous limits for mercury and chromium about 10 percent of the time. As noted in response to comment DA-4, almost all of the chromium entering the H-Area seepage basin is related to the processing of non-SRP reactor fuel elements. In 1983, mercury exceeded the 200 microgram per liter hazardous limit in 6 weekly composite samples, reaching a maximum of 640

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	water quality before discharge to the groundwater, to minimize impact on the groundwater system and associated discharge areas. In the meanwhile, the range of potential consequences of this situation should be discussed in Final EIS.	micrograms per liter. The total discharge (including the L-Reactor incremental releases) of chromium and mercury are expected to be below their respective hazardous limits on an annual average basis. The contaminant plumes from the F- and H-Area basins will be confined to the Tertiary groundwater systems. DOE Order 5480.2, "Hazardous and Radioactive Mixed Waste Management," was issued on December 13, 1982, to regulate the generation, transportation, treatment, and/or disposal of hazardous wastes at DOE defense-related facilities. As noted in Chapter 7 of this Final EIS, DOE is implementing--under the 22 February 1984 Memorandum of Understanding with EPA--a Hazardous Waste and Radioactive Mixed Waste Management Program which is comparable to the design and performance criteria, other technical requirements, and record keeping and reporting requirements of the regulations adopted by EPA to implement RCRA. The SRP hazardous-waste management program will meet the technical requirements of the EPA hazardous-waste regulations (40 CFR 260-266 and 270) and is compatible with SCDHEC requirements. DOE is also working closely with SCDHEC on all activities related to hazardous-waste management. The remedial actions proposed in the draft "SRP Ground-Water Protection Implementation Plan" are consistent with the DOE RCRA compliance program; initiatives will be compatible with SCDHEC hazardous-waste management regulations. DOE is formulating closure plans for seepage basins and the burial ground on a sitewide basis. The NEPA review of the ground-water protection plan will, when applicable, address the decommissioning of certain facilities to the extent practicable. The consequences that might result from the use of the L-Reactor seepage basin or one of the alternatives to its use have been discussed in Sections 4.1.2.2 and 4.4.3. Sufficient details are provided to assist the decisionmaker in formulating a reasoned decision relating to the disposal of deionized and filtered disassembly purge water.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-7	o Control and disposal of hazardous wastes generated by the operation of the L-Reactor are not adequately addressed. The types and quantities of hazardous wastes produced and how those wastes are handled in terms of storage, treatment and ultimate disposal need to be detailed. The Final EIS should address the type of technical standards which DOE will use for the storage, treatment, and disposal of hazardous wastes, as well as how DOE will comply with state and federal environmental permitting requirements for hazardous waste facilities under RCRA. In a letter to EPA in November 1980, DOE stated that it considered its hazardous waste activities at the Savannah River Plant to be exempt from regulation under RCRA. However, a June 22, 1983, opinion from A. James Barnes, EPA General Counsel, states that RCRA applies to DOE facilities except in instances where application of those regulations would be inconsistent with the requirements of the Atomic Energy Act. From the limited information on page 5-2, it appears that the facility does generate some wastes which will be regulated under RCRA. Therefore, the Final EIS should provide a list of those waste chemicals which are considered hazardous under RCRA, and a description of how these wastes will be handled in compliance with RCRA. During the permitting process, EPA will evaluate all groundwater quality data, the design and operating procedures for those basins/ponds, and any other hazardous waste activities. Section 5.1.1.2 describes the increase in contamination of the groundwater as a result of the L-reactor operation but does not discuss any remedial action for cleaning up the groundwater. This contamination is coming mainly from seepage basins in the F and H areas. Since the "SRP Groundwater Implementation Protection Plan" is mentioned in the response to DA-2, and since the corrective action for the seepage basins in areas F and H would be accomplished under that plan, a tentative schedule for its implementation should be developed. This schedule would take into consideration the uncertainties of the review process. If Order DOE 5480.2 incorporates the provisions of RCRA by reference, as stated, then it contains requirements for corrective action for groundwater contamination.	Sections 4.1.1.5, 4.1.1.7, 4.1.2.1, 4.1.2.2, 5.1.1.2, 5.1.2.1, 5.1.2.2, and 5.1.2.8, which have been expanded, discuss discharges from L-Reactor and the incremental discharges in the F- and H-Areas and M-Area. The handling of these wastes will be in accordance with DOE Order 5480.2 and the 22 February 1984 Memorandum of Understanding with EPA. DOE will cooperate with and coordinate these activities with SCDHEC. Effluent treatment facilities that would take the place of the F- and H-Area seepage basins are scheduled to be completed by October 1988, and the seepage basins are scheduled to be decommissioned by the end of 1990, pending Congressional authorization and appropriation. Current plans call for discontinuing the use of the M-Area seepage basin before April 1985 and operating a process wastewater-treatment facility at that time. The M-Area ground-water remedial action project is scheduled for implementation in August 1984. Also see the response to comment DA-6.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-8	- o The effect on groundwater of material leaving the seepage basins poses some further environmental concerns involving RCRA. F&H area studies have shown that chemicals, e.g., mercury, 1,1,1,-trichloroethane and chromium from the seepage basins have entered the shallow groundwater system and are migrating through the saturated soil to outcrop zones and springs near Four Mile Creek. Although water quality in the Savannah River is expected to meet the criteria for a Class B waterway below Four Mile Creek, there is no mention of how these groundwater discharges affect Four Mile Creek. This appears to demonstrate a method of discharging pollutants to a stream without a permit by using the groundwater as the medium of transport. Furthermore, RCRA requires that all hazardous wastes be contained or, if a treated by the land treatment method, that the contaminant not go beyond the treatment zone. Since there is a definite relationship between reactor operations and waste products generated and stored in all areas of SRP, this matter needs to be resolved in the Final EIS. - o Likewise, contaminants discharged to the seepage basin in M area have entered the groundwater. Methods to remove these contaminants are presently being investigated. Nonetheless, the basin will be deactivated in 1985. The resultant mitigation plan developed from these studies should be expeditiously formulated and made available for interagency review in a supplemental document. We recommend that closure plans for M area be developed immediately and that these closure plans contain enforced schedules. Post closure plans describing groundwater monitoring and corrective action for groundwater contamination, should also be developed. The closure and post closure plans should be submitted to EPA and the South Carolina Department of Health and Environmental Control for review. - o In a related matter, there is concern that the resumption of L-Reactor operation will result in increased groundwater withdrawal. This could cause additional drawdown of the groundwater level beneath adjacent seepage basins, thereby increasing the tendency of contaminants to enter the groundwater and migrate. This possibility should be factored into any mitigation study with the range of potential impacts discussed in the Final EIS.	RCRA considerations are discussed in the responses to comments DA-6 and DA-7. Gas chromatograph scans for hydrocarbons in the effluent released to F- and H-Area seepage basins show concentrations of less than 66 micrograms per liter. These concentrations are similar to those measured in upgradient and downgradient ground water (Section F.5.3; Du Pont 1983, DPST-83-829). As noted in Sections 5.1.1 and 5.1.2 discharges of chemicals and radioactivity have migrated from the ground water beneath the F- and H-Area seepage basins to outcrop zones near Four Mile Creek. As a result, concentrations of chloride, nitrate, sulfate, sodium, and calcium are substantially higher in Four Mile Creek upstream of C-Reactor cooling-water effluent than in Upper Three Runs Creek; the concentrations of these chemicals in Four Mile Creek are similar to those in the Savannah River (Table 4.17 in DOE, 1982, DOE/EIS-0082). Tritium and nonvolatile beta activities are also elevated in this stretch of Four Mile Creek, (Ashley et al., 1982, DPSPU 80-302), but do not exceed DOE concentration guides for uncontrolled areas. Incremental impacts to the water quality due to L-Reactor operation are expected to be small. At most, the concentrations will increase by 7 percent. The water quality of Four Mile Creek above the C-Reactor outfall will remain similar to that of the Savannah River. Tritium and other radionuclides in Four Mile Creek will not exceed DOE concentration guidelines for releases to uncontrolled areas. The DOE commitment to ground-water quality protection and remedial actions in relation to M-Area are discussed in response to comment DA-2. The migration of contaminants from seepage basins into the shallow groundwater systems and the protection of public health and safety are discussed in the revised Sections 4.1 and 5.1 of this EIS as well as in response to comments DA-4 and DA-5. Several hydrogeologic systems exist beneath the SRP seepage basins. A thick clay unit of the basal Congaree and upper Ellenton formations overlies the Tuscaloosa sands and separates this unit from overlying units. Other clays hold intermediate positions between the Tuscaloosa and the surface. Thus,

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		drawdowns in the Tuscaloosa will not tend to increase the movement of pollutants from seepage basins to the groundwater. In A-Area the cone of depression in the Tuscaloosa Formation is not reflected in the water level of the overlying Tertiary groundwater system even though the green clay is discontinuous in this area. The green clay in the Separations Area is about 2 meters thick and has a very low permeability; it supports a head difference of as much as 24 meters. Measurements at the H-Area seepage basins indicate that the underlying Congaree Formation has not been contaminated by tritium migrating from these basins. The green clay also supports a large head difference at the Par Pond pumphouse well. Tritium concentrations in this well are below background levels even though Par Pond water exhibits tritium concentrations of 27,000 pCi/l. At the pumphouse and in L-Area the green clay is about 7 meters thick and very impermeable. Groundwater withdrawal from the Tuscaloosa Aquifer for L-Reactor and incremental use is expected to be only a few percent greater than in 1982. The green clay and other clay units above the Tuscaloosa Formation will continue to offer protection to Tuscaloosa groundwater in areas where the upward head differential between the Tuscaloosa and Congaree Formations becomes zero or downward.
DA-9	o The large, uncontrolled, thermal discharges pose major regulatory problems. Since 1980, when President Carter decided to increase production of nuclear materials, there has been an apparent presumption that the L-Reactor could be restarted without any control of the thermal discharge. This presumption was apparently based on the prior operation of the plant and did not account for pollution laws enacted subsequent to the reactor being placed on "stand-by" in 1968. The Draft EIS recommends discharge of untreated cooling water to Steel Creek. Steel Creek is presently classified as a Class 'B' stream in South Carolina. Such a classification means that the stream is suitable for fishing, survival and propagation of fish and other fauna and flora. The proposed action would allow eleven cubic meters/sec of effluent, at 80°C, to be discharged to the stream. Such action will effectively eliminate the present life forms from the stream. As such, we determine that the proposed action is not compatible with the established water use classification assigned to Steel Creek. We noted that Steel Creek was	Section 4.4.2 of the EIS, which discusses cooling-water mitigation alternatives, has been revised based on public comments received on the draft EIS. Specifically, Section 4.4.2 has been revised to provide a detailed discussion of additional combinations of various cooling-water systems. In Section 4.4.2, each of the cooling-water mitigation systems is evaluated for attaining the thermal discharge limits of the State of South Carolina. Section 4.4.2 and a revised Appendix I, Floodplain/Wetland Assessment, discuss the wetland impacts of each of the systems considered. The Department of Energy has been reviewing and evaluating alternative cooling-water systems for L-Reactor. Based on these reviews and evaluations, and consultations with representatives of the State of South Carolina regarding a mutually agreed upon compliance approach, a preferred cooling-water mitigation alternative is identified in this EIS. This preferred cooling-water alternative is to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in the lake. The Record of

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	previously subjected to a thermal effluent and suffered adverse impacts similar to these noted above. However, since the discharge was terminated habitat/species succession has occurred such that the area has recovered, to a great extent. The proposed discharge would reverse the recovery and, in our evaluation, would be a violation of the State water quality standards. In a related matter, we believe the discussion of the NPDES permit action avoids a major issue. Namely, what alternatives will the Department of Energy consider if the permit is not granted under the conditions anticipated in the Draft EIS? o EPA has been performing various modeling analyses to estimate the radiological impact of current and future releases at the SRP. The results of these analyses compare closely with the calculated values which were generated by DOE and presented in the Draft EIS. In addition, field surveys were conducted by EPA to determine radioactivity in air emissions from the plant site by direct measurement. Although the report of this data is still in preparation, EPA's monitoring data appear to be within a few percent of DOE's results. These surveys and analyses were conducted not only for comparative purposes to verify EPA's analysis against DOE's models, but to establish an additional data base for EPA's standard setting effort under Section 112 of the Clean Air Act (CAA). Considering the dose and risk numbers which EPA generated for DOE facilities as a part of proposing standards for CAA, we find that the proposed L-Reactor operations will comply with the standard which EPA is proposing. o The total occupational doses which DOE expected from the operation of L-Reactor were also reviewed. "The total expected occupational dose from operation of L-Reactor and its support facilities is 360 person-rem (i.e., 69 person-rem for L-Reactor and 291 person-rem from support facilities). The average work force in each reactor area is about 375 people; thus, the average annual individual dose to workers in the L-Area will be about 185 millirem per year." Comparing these numbers to EPA's proposed Radiation Protection Guides (Federal Register Vol. 46, No. 15, Friday, January 23, 1981), which proposed 5 rem whole body, we found that L-Reactor will be below EPA's proposed Radiation Protection Guides for occupational workers.	Decision prepared by the Department on this EIS will state the cooling-water mitigation measures that will be taken which will allow L-Reactor operation to be in compliance with the conditions of an NPDES permit to be issued by the State of South Carolina.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	An assessment of the health impact from resumed operation of the L-Reactor indicates an estimated individual lifetime fatal cancer risk of $1.0E-4$. The estimated collective cancer risk per year of operation is $5E-3$, with 85 percent of the risk due to tritium. Ingestion is also the major contributing liquid pathway to health risk (72 percent). We can conclude from the above that the risks to the general public, off-site, should be considerably less than the estimated on-site risks.	
	The EPA National Interim Primary Drinking Water Regulations, promulgated under the provisions of the Safe Drinking Water Act, became effective in June 1977, and apply to the community water supply systems such as those at Beaufort-Jasper, South Carolina, and Port Wentworth, Georgia, downstream of the Savannah River Plant. These regulations include limits for radionuclides, such as tritium, radiocesium, cobalt, and strontium, that will limit radiation doses to water users to less than 4 millirem per year. Both of these water supplies have been monitored by the states. Radiation exposures in recent years have been about 0.28 mrem/year. Based on the expected releases from the restart of the L-Reactor, its contribution has been estimated at up to .04 millirem per year from tritium, radiocesium and cobalt from the L-Reactor, or a contribution of about one-seventh of the total. The total dose of about 0.32 mrem/year is about one-twelfth (1/12) of the EPA Drinking Water Standard.	
DA-10	Further radiological and monitoring data should be presented at scheduled intervals, perhaps as supplements to the Final EIS, or as monitoring and data reports. This supplemental information should include any observed displacement of radioisotopes, which are now contained in Steel Creek sediments, together with and monitoring data from the seepage basins and surrounding wells, until such time that these seepage basins are discontinued.	Radiological monitoring of Savannah River water, water supplies at Beaufort-Jasper and Port Wentworth, and aquatic food supplies from the river and the estuary are reported annually in a series of reports entitled <u>Environmental Monitoring in the Vicinity of the Savannah River Plant</u>; the most recent issue, for calendar year 1982, is DPSPU-83-30-1. Expanded monitoring, to assess the displacement of radioactive isotopes in Steel Creek and in the Savannah River swamp, will be included in future issues of this report. Onsite monitoring of wells and seepage basins is reported annually in a series of reports entitled <u>Environmental Monitoring at the Savannah River Plant</u>. This report is an internal report for DOE and its contractors for use in reviewing the effects of ongoing SRP operations. DOE is considering placing this report in the DOE Public Reading Room in Aiken, South Carolina.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
Specific Comments		
2.2 Proposed Action -- Restart of L-Reactor		
DA-11	<u>p. 2-11, Fig. 2-2</u> - The release data summary for SRP (Ashley, Zeigler, and Culp, DPSPU 81-25-1) refers to radionuclides seeping from the L Oil and Chemical Basin. Where is it and why is this source of radionuclides not mentioned in the DEIS?	The L-Area oil and chemical pit, which is approximately 70 meters northeast of the L-Reactor seepage basin, received low levels of radioactive oil and chemical waste from 1961 to 1979. This pit is no longer in use; it will not be used when L-Reactor operation is resumed. The pit will be included in the overall hazardous waste management program under DOE Order 5480.2.
3.7 Radiation Environment		
DA-12	<u>p. 3.57, para. 6</u> - Radiation exposure from dental prostheses and cardiac pacemakers are medical sources rather than environmental sources.	The statement on p. 3.57 of the draft EIS has been modified to delete dental prostheses and cardiac pacemakers.
DA-13	<u>p. 3-58, para. 4</u> - Internal dose may be site dependent. Individuals living near the SRP boundary may receive a higher internal dose from eating contaminated foods (H-3) than individuals living farther away from the plant. Also, the chemistry of different soil types will yield differing radionuclide uptakes by plant foods. <u>p. 3-61, para. 2</u> - The 1982 release of radioactivity from L-Area to Steel Creek produced concentrations below that which would be considered harmful. In fact, the concentrations reported to have been measured in the canal were less than the EPA limits for drinking water.	The internal dose referred to in this paragraph was the natural internal radiation dose (see Table 3-15 of the draft EIS). Such a dose, received primarily from natural radioactivity in the diet, is generally considered to be independent of a site because of the wide distribution of food and fertilizers.
DA-14	<u>p. 3-63, Table 3-18</u> - The data in this table do not reflect the true contribution L-Reactor has had on the Cs-137 build-up in the sediments of Steel Creek. Referral to Table D-3 (p. D-8) shows that the area affected between L-Reactor and Road A is about 7 times greater than between P- and L-Reactor. Table 3-18 should be expanded to include this information or, at least, reference should be made to Table D-3 in a footnote.	Reference in the text of Section 3.7.2.1 has been made to Table D.3.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-15	p. 3-65, Figure 3-14 - How many of the 55 unexplained curies of Cs-137 can be explained by the uncertainty in the estimates? That is, what are the + values on the 284 Ci released and on the 229 Ci sediment inventory. Although only a minor contribution, the 0.4 Ci estimated to be in Steel Creek biota seems low. An estimate of the mass of vegetation along Steel Creek from L-Reactor to the Savannah River is apparently not included in the DEIS.	Inventory estimates were made using three different techniques based on stratified random sampling, aerial gamma spectroscopy, and a "weighted" analysis of radiocesium contents (microcuries per square meter) of individual soil cores. Error estimates could be calculated only for the stratified random sampling estimate: 56.89 ± 8.86 Ci (± 95 percent confidence limit). This estimate provided the lowest estimate (mean) of the radiocesium inventory. The highest inventory estimate was derived from the "weighted" soil core analysis (67.09 Ci). This highest estimate was used as the inventory in Steel Creek. Greater detail on these analyses is presented in Smith et al., 1982, Chapter VI). Section 3.7.2.1 and Appendix D provide possible explanations for the unaccounted for cesium-137. The transport calculations were made independent of the inventory estimates.
	p. 3-66 - Concentrations of Cs-137, Co-60, and Sr-90 in water where there is a possibility for consumption are presently at levels that present no health hazards.	The transport during the first year attributable to biotic transport is based on a surficial biomass inventory of 304 grams per square meter. Based on Tables D-3 and D-10 of the Draft EIS and the biomass estimate of 304 grams per square meter, the transport estimate is about 0.13 curies, some 3 times less than the 0.4 curies used in the total transport estimate of 4.4 ± 2.2 curies during the first year.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-16	p. 3-66, 3.7.2.3 - This section is vague and should be improved on the basis of measured Sr-90 concentrations in Steel Creek sediments and vegetation. DPSPU 81-25-1 records suggest that the 63 Ci are now in Steel Creek or downstream. The fact that kaolin has little sorptive capacity for strontium does not assure its absence in Steel Creek; nor does its absence in the Swamp downstream. Clay soils do not have quite the same ion-exchange characteristics for cobalt as they have for cesium. Thus, transport to the Savannah River may be more rapid for Co-60 than for Cs-137. However, Co-60 levels do not appear to be significant.	Approximately 0.5 curie of strontium-89 and 40.8 curies of strontium-90 were released to Steel Creek from L- and P-Areas (Ashley, et. al., 1982). Because of its short half-life (50.5 days), no measurable quantities of strontium-89 are likely to exist in the creekbed sediments. Strontium-90 has a half-life of about 28 years. About 14.3 curies of strontium-90 have been lost by radioactive decay. Based on ERDA (1977) and Marter (1974), another 20.8 curies have been transported to the Savannah River. Thus, about 5.7 curies of strontium-90 might still remain in the sediments of Steel Creek. Soil coring in Steel Creek at Road 8, Cypress Bridge, and near its mouth has detected strontium-90 concentrations ranging from 0.11 to 0.14 picocurie per gram in 1978 to 0.12 to 0.24 picocurie per gram in 1979. At the SRP control station, strontium-90 concentrations of soil samples were 0.06 picocurie per gram in 1978 and 0.14 picocurie per gram in 1979 (Ashley et al., 1982). These soil coring studies suggest that the inventory might be much less than 5.7 curies. It is not surprising that most of the strontium-90 has been transported from Steel Creek, because the kaolin clay particles of the creekbed sediments have little sorptive capacity for strontium. The distribution coefficient for strontium-90 in SRP kaolinitic soils might be as low as 20 (Oblath et al., 1983), at least 35 times less than that for cesium-137. Strontium-90 has not been detected above background levels in Creek Plantation swamp sediments. However, this radionuclide has been detected in composited swamp vegetation samples at concentrations of a few picocuries per gram (Marter, 1974).

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>4.1.2 Radiological Impacts of L-Reactor Operation</u>		
DA-17	<u>Page 4-24, Figure 4-6</u> - Some environmental transport models will include consumption of contaminated water by meat and milk producing animals. The authors may wish to recognize this potential pathway and comment on its relevance to the SRP in the text.	There is no known use of downstream Savannah River water to supply milk- or meat-producing animals or for farm crop irrigation. Assuming that irrigation of 1000 acres of farmland could potentially occur in the future, the dose to the consuming population would range between 0.005 percent of natural background radiation for leafy vegetation and 0.05 percent of natural background for vegetation. The dose for consumption of milk and meat would be between this range.
DA-18	<u>p. 4-25, 4.1.2.2</u> - The earlier belief that lower-lying aquifers (Ellenton, Tuscaloosa) would not be contaminated by seepage has been undermined by observations of chlorocarbons in these aquifers at other locations on site. Can the statement in the third paragraph "tend to preclude contamination" be made more specific by groundwater quality data analysis at this location? "Mitigation" should probably be "migration" in the second paragraph.	The text of the EIS has been changed to reflect the information in this response and to correct the typographical error noted in the comment ("mitigation" to "migration").
DA-19	<u>p. 4-27, Table 4-11</u> - Values listed in this table were computed and found to be correct. The radionuclides Mn-54, Fe-55, Fe-59, Co-57, and Ni-63, are not mentioned although they are common activation products. Were attempts made to measure them? <u>p. 4-28</u> - NRC codes and parameters (Reg. Guide 1.109) were used to compute individual and population doses (Appendix B). Although these methods may not exactly duplicate those in use by EPA, they are comparable. Dose equivalents listed in Tables B-7 to B-10 for atmospheric releases from L-Reactor appear reasonable based on a 1982 EPA study of the airborne releases from P-Reactor.	Most of the radionuclides listed in Table 4-11 are those that will be released to the environment after filtration and de-ionization. These expected releases are based on radionuclide analyses of effluents from existing operating reactors. Manganese-54, Iron-55, Iron-59, cobalt-57, and nickel-63 are not normally detectable in treated reactor effluents at SRP.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-20	<u>p. 4-29, Table 4-14</u> - If these dose equivalents are 100-yr dose commitments (p. B-35, para. 2) the table should so state.	All population doses shown in the EIS are 100-year dose commitments, as described in Appendix B. This has been clarified in the EIS.
DA-21	<u>Page 4-28, 4-29 and Figure 4-6</u> - The pathways described in the text for liquid releases do not include use of river water for irrigation of human food crops or animal feed crops. However, Figure 4-6 shows irrigation as a pathway. In some dosimetric and risk calculations, irrigation has proven to be a major pathway to man. The authors should state their reasons for not including irrigation as a pathway in their individual and their population dose equivalent and risk calculations.	Figure 4-6 of the draft EIS is a generic exposure pathway description (not specific to SRP) that is covered in models recommended by the Nuclear Regulatory Commission (Regulatory Guide 1.109). There is no known use of downstream Savannah River water to supply milk- or meat-producing animals or for farm crop irrigation.
DA-22	<u>Page B-14, last paragraph (continued on page B-31)</u> - Since special models have been used for H-3, C-14, Kr-85, and I-129, the final EIS should provide the references for these models in the bibliography.	The Final EIS has incorporated the applicable references in the bibliography to Appendix B.
DA-23	<u>p. 4-29, last para.</u> - How does the drinking water concentration of tritium at the Beaufort-Jasper and Port Wentworth water intakes compare with the EPA drinking water limit? What does 0/yr water consumption mean in Table B-20? 1/yr?	Based on an average river flow rate of 294 cubic meters per second and tritium release values listed in Table 4-10, tritium concentrations in Beaufort-Jasper and Port Wentworth water will be 39 picocuries per liter and 1034 picocuries per liter from L-Reactor operation in the first and tenth years, respectively. These are 0.2 and 5.2 percent, respectively, of the EPA drinking-water standard of 20,000 picocuries per liter. The "0/yr" water consumption in Table B-20 was a typographical error; the entry should read "1/yr." This has been corrected in the Final EIS.
DA-24	<u>Page B-32, Table B-18</u> - For some nuclides, limiting the environmental dose commitment (EDC) calculations to a 100-year integration period and to consideration of the U.S. population, may cause the major portion of the infinite EDC to the world population to be left unreported. For example, Fowler predicts the total body EDC to the world population for a release of 1 Ci of C-14 to the atmosphere (as CO ₂) to be 28 man-rem/Ci	A 100-year environmental dose commitment (EDC) was used in the EIS rather than an infinite EDC; this provides more meaningful results by accounting for impacts over a period of time comparable to the maximum lifetime of an individual (Section B.5). Thus, it provides the measure of risk to an individual. Longer integrating periods or an infinite time integral would require extremely speculative predictions about man's environment for thousands of years into the future.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	released with a 100-year integration period, 120 man rem/Ci released with a 1,000-year integration period, and a 537 man rem/Ci released with an infinite integration period (Fowler and Nelson, "Health Impact Assessment of C-14 Emissions From Normal Operations of Uranium Fuel Cycle Facilities," EPA 520/5-80-004, June 1979, Figure 5). Using Fowler's results to estimate the EDC to the world population during the 100-year period following release of 12 Ci of C-14 from the L-Reactor, one obtains 336 man rem (total body) compared to the SRP estimate of 8.4 (for the U.S. population). The infinite EDC due to the release of 12 Ci of C-14 to the atmosphere would be 6,440 man rem, using Fowler's data.	
DA-25	p. B-35 - The bioaccumulation factor used for Cs-137 in fish is 3000. According to the document this is a measured value, but it is much larger than values generally used that range between 40 and 1300 for freshwater fish. The use of 3000 probably overestimates the Cs-137 concentration in fish.	Section D.2.2 presents details on the selection of the cesium-137 bioaccumulation factor of 3000.
DA-26	p. 4-30, para. 4 - A discussion on pages D-31 and D-32 indicates that the estimated first-year sediment/water transport of Cs-137 after L-Reactor start-up was reduced from a 1981 estimate of 7.2 Ci to 2.3 Ci based on a recent estimate. The latter appears reasonable, but not having the references describing the first estimate (DuPont, 1982a) and considering the importance of this pathway, it would be useful to explain in Appendix D the reason for the 5.4 Ci/yr reduction.	Early estimates of radiocesium transport were based on modeling predictions (Du Pont, 1982, DPST-81-241). The transport estimates used in this EIS were based on measurements of radiocesium during cold flow tests. Using empirical data is believed to be the better method for determining annual activity that will be transported. The 1981 estimate of sediment-water transport was obtained by assuming (1) that the suspended solid concentrations in the secondary cooling water flowing in Steel Creek would be equal to that supplied from the Savannah River (15 milligrams per liter); and (2) that the suspended creek silts and clays would have a cesium-137 concentration of 1200 picocuries per gram of suspended sediment. Bed load transport was not considered. Thus, the 1981 estimate for sediment-water transport for the first and second years after restart was calculated to be 7.2 curies per year ($0.015 \text{ gram per liter} \times 4.0 \times 10^{11} \text{ liters per year} \times 1200 \text{ picocuries per gram} \times 1.0 \times 10^{-12} \text{ curie per picocurie}$).

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		To refine these estimates, cesium-137 sediment-water transport was studied during the March 1982 testing of the secondary cooling-water system with discharges of Savannah River water at near-ambient temperatures and at flows as high as 6.2 cubic meters per second (more than half that expected during L-Reactor operation). These test results showed that the sediment-water transport would be 2.3 ± 1.8 curies (Section D.4.3.1) during the first and second years after the restart of L-Reactor. Subsequent monitoring results for 1983 support this estimate.
DA-27	<u>p. 4-34, Table 4.17</u> - What radionuclide is responsible for the relatively high dose to the liver? Is it assumed to be Co-60?	The radionuclide responsible for the relatively high dose to the liver is cesium-137. Cobalt-60 contributes less than 1 percent to the liver dose to all age groups.
DA-28	From a comparison of liquid pathway doses, that due to the mobilization of Cs-137 and Co-60 from Steel Creek sediments exceeds the impact of all other pathways many times. This is clearly illustrated in Table 4-19. This is a very significant fact that should greatly influence the surveillance program initiated when L-Reactor begins operation.	See the response to comment DA-10.
DA-29	<u>p. 4-35, para. 1</u> - It states in the text that the maximum population dose is 27.6 person-rem in the tenth year of operation, whereas Table 4-19 lists a value of 14.3 person-rem for that period. Is the 27.6 person-rem a committed dose, or why the apparent disagreement? <u>p. 4-35, para. 2</u> - The health effects listed here are correctly computed using the values of 120.3 fatal cancers per million person-rem given in Table B-49 for low-LET radiation, and 257 genetic effects per million person-rem given in Section B.6.	The 27.6 person-rem in the tenth year is the sum of the 80-kilometer population dose (14.3 person-rem) and the Port Wentworth and Beaufort-Jasper population dose (13.3 person-rem) listed in Table 4-19 of the draft EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
4.2.1 Reactor Accidents		
DA-30	p. 4-38 - The curie quantities of Ar-41 released by SRP reactors are second only to tritium estimated for L-Reactor: (19,500 Ci/yr vs. 54,900 Ci/yr from Table 4-10), yet no mention is made of the release of any Ar-41 following an accident. Granted, Ar-41 has a short half-life (1.83 hr) and much would decay during transit to the site boundary. However, considering the distance to the site boundary to be 9 km (5.6 miles), half the Ar-41 would survive to the site boundary assuming a wind speed of only 3 mph. Thus, Ar-41 should be included in an accident analysis of L-Reactor, or an explanation given as to why it has not been considered.	A small annulus surrounds the reactor tank; ventilation air flows through it during normal operations. Argon-41 is formed by neutron capture of argon-40 present in the air, which is vented through the airborne activity confinement system and the 61-meter stack. Because argon is a noble gas, it is not trapped by the confinement system. In the event of an accident, the reactor is promptly shut down; argon-41 production essentially stops. The dose contribution from argon-41 is negligible compared to that from noble gas fission products in any accident scenario.
DA-31	p. 4-41, para. 2 - Isn't immersion in the plume a usual airborne exposure pathway considered, or have you considered this as plume shine? They are not the same and immersion should be considered.	Changes have been made in the EIS to clarify this point.
DA-32	p. 4-53, last two para. - Following an accident all coolant, ESC flow, and any other contaminated water is retained in holding tanks. Thus, none will be released to Steel Creek and the Savannah River. However, what releases will occur later during clean-up and reactivation of the reactor?	All water used in reactor cleanup and reactivation would be processed to remove radioactivity before its discharge.
5.1.2 Radiological Effects of Support Facilities		
DA-33	p. 5-12, Table 5-7 - It is surprising that no U-238 is released to surface streams.	All effluents with detectable amounts of uranium will be discharged to seepage basins (Table 5-8). Thus, Table 5-7 lists no releases directly to surface streams.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-34	p. 5-12, 5.1.2. - Accidents and incidents in support facilities are not discussed as sources of radiation exposure, although their potential should be considered. Every few years, significant amounts of tritium are accidentally released to the atmosphere and elevated plutonium levels on site are due to such an accident.	The major sources of tritium releases are associated with SRP facilities that are involved in the production of tritium. Since the purpose of L-Reactor is the production of plutonium, only those support facilities involved in the processing of plutonium are discussed in this EIS. A new section, Section 5.1.2.9, has been added to this final EIS to discuss the incremental risk of accidents for support facilities.
DA-35	p. 5-13 and p. B-48 - The maximum organ dose to the adult, like the child, is to the bone (0.12 mrem/yr) rather than the total body dose of 0.022 mrem/yr given in the report. This should be mentioned. Also, eating fish and drinking water are the critical water pathways. Also, what radionuclides contributed most to the bone dose?	The main body of the DEIS generally presents only doses to the age group receiving the highest body or organ doses. Doses for all age groups and all organs are presented in Appendix B. Fish and drinking-water pathways accounted for most of the bone dose; strontium-90 contributed the most to this dose.
DA-36	Table B.30 to B.33 - A comparison of the dose received during the first year due to support facilities leads to an interesting observation that cannot be explained by the information provided. Except for the dose to bone, which is identical during the first and tenth years for the 80 km population, the maximum individual, and for the population drinking water (Beaufort-Jasper and Port Wentworth), a large increase (5-7 times) occurs to the organ doses of the population drinking water from the first to the tenth year that does not occur to the maximum individual or to the 80 km population. It does not appear that the release to surface streams from the seepage basins could account for this large increase. Only the thyroid dose increases similarly among the three groups (a factor of about 6) which is assumed to be due to I-131, but it should have totally decayed during the three to four year delay in reaching the surface streams from the seepage basins (p. 5-15).	Doses during the first year are based on direct releases to surface streams (draft EIS Table 5-7). During the tenth year, additional radioactivity will enter surface streams from seepage basins (draft EIS Table 5-9). Most of the dose increase to downstream individuals and populations between the first and tenth years is caused by the increase in tritium releases. This increase has little effect on the 80-kilometer-radius population because they do not consume river water. The exposure pathways for the 80-kilometer-radius population are fish, shoreline activities, swimming, and boating (Appendix B).

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

If there is a simple explanation for these increases in organ doses from support facility effluents, it should be given. See table below.

Tenth year dose/first year dose

Bone	Liver	T. Body	Thyroid	Kidney	Lung	G.I.
------	-------	---------	---------	--------	------	------

80 km population

1.0	1.0	1.1	5.1	1.1	1.4	4.1
-----	-----	-----	-----	-----	-----	-----

Maximum Individual

1.0	2.0	2.2	6.7	3.1	4.7	6.2
-----	-----	-----	-----	-----	-----	-----

Beaufort-Jasper and Port Wentworth

1.0	6.5	5.5	6.8	5.9	6.7	7.2
-----	-----	-----	-----	-----	-----	-----

DA-37

p.5-14, Table 5-8 - See above comment for Table 4-11; also consider I-129 in liquid effluent.

Only trace quantities of Iodine-129 are released in liquid effluents. Such releases are included in the category "other beta, gamma" in Table 5-8. For purposes of dose calculation, "other beta, gamma" was conservatively assumed to be strontium-90 (Table 5-8, footnote C).

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-38	p. 5-15 - We believe that the critical pathways and radionuclides are important information. Although the pathways can be obtained from Appendix B, it would be useful to include it here. For example, the thyroid is the critical organ and the dose received is primarily due to consuming vegetables and milk containing radio-iodine. Possibly the two short paragraphs presenting the doses from atmospheric releases can be expanded to include this information.	To avoid overburdening the reader with voluminous tables of pathway analysis in the main body of the EIS, this data is presented in Appendix B. Material has been added to Section 5.1.2.3 of the EIS to identify the pathways (milk and vegetation) and radionuclides (iodine-129 and -131) that contribute most to the maximum organ (thyroid) dose.
DA-39	p. 5-16, Table 5-10 - The tritium value seems to be for the first year, with ten times as much released after 10 years, but this is not mentioned. For the separations areas (F&H) the listed value for tritium (H-3) is 8.6×10^3 Ci/yr while DPST-82-1054 Savannah River Plant Airborne Emission and Controls report indicates a value of 8.6×10^4 Ci/yr for the separations areas.	Tritium atmospheric releases of 9.4×10^3 curies total do not increase for support facilities as they do for L-Reactor between the first and tenth years. Release estimates for tritium are correct for the type of operation planned for L-Reactor.
DA-40	p. 5-17, Table 5-11 - The lower total body dose from atmospheric releases after 10 years does not make sense in view of the much higher tritium releases. Neither does the explanation that maximum exposure locations are changed. To the best of our knowledge, the atmospheric dispersion model applied by SRP is simplified so that all sources are assumed to be released at a central location on site.	Atmospheric dose calculations for L-Reactor use L-Reactor as the release point; doses from support facilities are calculated as if releases occurred at the center of the Plant. The location on the site boundary where the maximum individual resides was selected as the place where the total maximum offsite doses from L-Reactor and support operations are predicted to occur. Because releases are constant over time from support facilities but increase over time for L-Reactor tritium, the geographic location of L-Reactor with respect to total releases becomes more important over time. Thus, the location of the individual receiving the maximum dose from L-Reactor plus support facilities changes with time. This is not caused by a change in atmospheric dispersion with time.
DA-41	p. 5-17, Table 5-11 - It is highly unlikely that the individual receiving the maximum airborne exposure will also be the same person receiving the maximum exposure through the aquatic pathway. It is probably not appropriate to add these two doses, but it does show a very small total dose.	As stated in Section 5.1.2.4 of the EIS: "The numbers listed as totals for individual and population doses are conservative maximums; to receive these doses, the composite individual (or population) would have to occupy several locations simultaneously."

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-42	<u>p. 5-17, para. 1</u> - The maximum population dose of 8.1 person-rem for the tenth year is correct only if the Port Wentworth and Beaufort-Jasper population receives the 2.8 person-rem via the air pathway. It is assumed they would not be outside the 80 km radius. <u>p. 5-17, last para.</u> - The health effects checked by calculation were found to be correct using the factors given in Appendix B.6.	See the response to comment DA-41.
DA-43	<u>p. 5-18, Table 5-12</u> - Is additional utilization of Savannah River water for public water systems downstream contemplated in view of current groundwater level lowering in the Savannah-Hilton Head area? Such increased consumption would increase the regional population dose. <u>p. 5-18, Table 5-12</u> - Values listed in this table were correctly summarized from earlier tables.	Utilization of Savannah River water is based on projections for the year 2000; it includes growth in consumer population size caused not only by population growth but also by changes from well-water supply to river-water supply by a sizeable portion of the population for both Beaufort-Jasper and Port Wentworth.
DA-44	<u>p. 5-19, para. 1</u> - Adding these doses is a very conservative approach, but is not appropriate (see similar comment above). It may conceivably be the same individual that receives the maximum dose from the liquid releases and radiocesium transport, but it is highly improbable that this person will also receive the maximum atmospheric dose. <u>p. 5-19, para. 5</u> - The health effects were correctly computed for the U.S. population beyond the 80 km radius of SRP using the factors given in Appendix B.6.	See the response to comment DA-41.
<u>5.2.6 Cumulative Impacts-Radiological Effects</u>		
DA-45	<u>p. 5-33, Table 5-19</u> - Values in this table agree with those in Appendix B. <u>p. 5-33, Table 5-19</u> - Values under the liquid release column (Regional Population Dose) have included in them the contribution from consuming water in the Beaufort-Jasper and Port Wentworth regions and, thus, should so indicate with superscript (c) on each value.	Through typographical error a Greek phi was printed after "Regional Population Dose" in Table 5-9. This has been replaced with a "c" in the Final EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-46	<u>p. 5-33, Table 5-19</u> - Do these doses include the effect of I-129 releases based on actual measurements in vegetation and thyroids? The paper by Kantelo, Tiffany and Anderson in Environmental Migration of Long-Lived Radionuclides (IAEA, Vienna, 1982) p. 495 indicates a maximum (worst case) dose of 1.6 mrem/yr. The summaries are difficult to check because Appendix B dose compilations are not itemized by radionuclide; could this information be provided?	Doses listed in Table 5-19 are based on models described in Appendix B and include no doses based on actual environmental monitoring data. However, data from studies at the Savannah River Laboratory by Kantelo have been used to verify model calculations of Iodine-129 dispersion in the environment.
DA-47	<u>p. 5-34, Table 5-20</u> - According to footnote (a), concentrations of Co-60 in drinking water were based on a dilution with 300 cubic meters of water per second. However, there is no reduction in the Co-60 concentration between river water below the plant and drinking water at Port Wentworth or Beaufort-Jasper. Also, why is the Sr-90 concentration not considered for dilution along with some decontamination of the water treatment plants?	Cesium-137 concentrations in Beaufort-Jasper and Port Wentworth drinking water are based on studies made in the mid-1960s when cesium concentrations were more easily measurable in river and water-treatment-plant water. These concentrations take into account additional dilution downriver from other surface water and decontamination across the water-treatment plants. Decontamination data were not available for cobalt-60 or strontium-90; thus, no adjustments were made for these radionuclides in Table 5-20.
DA-48	<u>p. 5-34, Table 5-20</u> - The I-131 concentration in milk due to L-support is inconsistently high relative to the entire SRP source; which is wrong? Similarly, the C-14 concentration in air due to L-Reactor is inconsistently high relative to the entire SRP source.	Typographical errors account for the apparent discrepancies in Table 5-20. Iodine-131 concentration in milk from L-Reactor support facilities should be 1.2×10^{-3} picocuries per liter rather than 1.2×10^{-1} . Similarly, carbon-14 in the air from L-Reactor should be 9.3×10^{-3} picocuries per cubic meter rather than 9.3×10^{-1} picocuries per cubic meter. The concentration of argon-41 from SRP should be 1.4×10^1 picocuries per cubic meter rather than 1.4×10 , making the total 2.3×10^1 instead of 2.3×10 . These have been corrected in Table 5-20 of the Final EIS. In addition, the footnote to this table has been changed to clarify how concentrations were calculated.
	<u>p. 5-35, para. 1</u> - The computation of health effects are correct based on factors given in Appendix B.6.	
	<u>6.1.1 SRP Monitoring Programs</u>	
DA-49	<u>p. 6-1, para. 3</u> - A brief description of the TRAC Laboratory Plume Monitor and its capabilities should be included in this discussion. It is certainly an asset to SRP airborne surveillance capabilities.	The TRAC plume monitor is a research vehicle and is not used in the routine environmental monitoring program. However, it is available and will be used in the event of a plant radioactivity release accident.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DA-50	p. 6-10, Section 6.2.4 - The monitoring for Cs-137 in the creeks accepting discharges, and especially in Steel Creek, and in the Savannah River adjacent to SRP, has special importance because this Report strongly indicates that this is the pathway (redistribution and transport of Cs-137 in creek sediments) that will have the greatest radiological impact due to L-Reactor start-up. Therefore, it is crucial that an intensive study be taken during the first year following start-up to monitor and measure the quantity of Cs-137 that is transported along the creeks and into the Savannah River. Also, the study should be continued after the first year to confirm if a decrease in Cs-137 transport occurs as is predicted. The document states that Cs-137 is below detectable levels in the Savannah River and that a special monitoring program for Cs-137 will be initiated. Does this special program include making absolute measurements of the Cs-137 in river water? It is believed that periodic measurements of the actual Cs-137 concentration in the river water should be determined before and after L-Reactor start-up. This can be accomplished by concentrating the Cs-137 from large water volumes by ion exchange with further concentration, if necessary, by published radiochemical techniques.	See the response to comment DA-10. When necessary, cesium-137 concentrations in river water will be monitored by techniques appropriate to the concentration levels. This includes the use of ion-exchange columns to remove and concentrate cesium-137 from water for radioanalysis.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MARGUERITE S. RICE		
	3021 Fox Spring Rd. Augusta, GA 30909 November	
	Melvin J. Sires III U.S. Dept. of Energy Savannah River Operations Office P.O. Box A Aiken, So. Carolina 29801	
	Dear Melvin Sires:	
	I am an individual, a family member, a registered nurse in the Augusta area, concerned with maintaining health, preventing illness, and helping people regain their well-being. I am well aware, in this field, of how interdependent we are, not only with one another but with other animals, plants, air, water - in other words with everything that constitutes our environment. Major changes are not made in one area or with one segment of the population that do not have far-reaching effects on us all.	
DB-1	Such is the nature of my concern over the proposed restart of the L-Reactor at SRP. A tremendous increase in the amount of scalding water going into a CSRA creek is not only in violation of state water quality regulations but is a violation of the very life of plants and animals in that area which in the ecological balance affects not only their lives but ours as well.	See the responses to comments AA-1 and AA-3 regarding cooling-water mitigation alternatives and DOE's commitment to comply with applicable Federal and state environmental protection regulations, and the response to comment BM-1 regarding DOE's Record of Decision on this EIS.
DB-2	I am also totally opposed to using the Savannah River as a waste dump for radioactive and/or toxic chemicals.	See the response to comment BT-2 regarding water quality.
DB-3	The necessity of meeting production schedules is not a reasonable response to me or any others who have felt the health and safety of the area residents at severely increased risk over this proposed restart of the L-Reactor.	As pointed out in the EIS, the need for plutonium was established by two different administrations in Nuclear Weapons Stockpile Memoranda. Also see the responses to comments AA-3

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

and AB-17 regarding DOE's commitment to comply with all applicable Federal and state environmental protection regulations and the effects of past radiological releases.

I sincerely hope that my views will not only be added to those of others but will be heard.

Thank you.

Sincerely,

Marguerite S. Rice

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MICHAEL MURRAY		
	Michael Murray 13 Warbler Lane Hilton Head Island, SC 29928 November 5, 1983	
	U.S. Dept. Energy P.O. Box A SRP Operations Office Aiken, SC 29801	
	ATTN: M.J. Sires III	
	Dear Mr. Sires:	
M-290 DC-1	The environmental impact statement addresses the epidemiological studies, but fails to study entomological studies: namely <u>"Pacco Wave" Theory</u> . Also Drs. Sergie Carpista of the USSR and Dr. Carl Sagan and Dr. Edward Teller agree in principle that a limited 5 megaton atomic warfare would eventually annihilate the world by blowing up the ozone, creating dust clouds and causing a freeze, starvation and billions of deaths. Why build more A bombs in light of these recent findings. Please do not reopen the L-Reactor until further studies are made.	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.
	M. Murray	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF LAWRENCE D. BENEDICT		
	Lawrence D. Benedict 38 Ivy Chase Atlanta, Georgia 30342	
	November 7, 1983	
	Melvin J. Sires, III Assist. Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, SC 29801	
	Dear Mr. Sires:	
	I have previously addressed statements during Savannah River Plant EIS hearings representing the League of Women Voters, Savannah-Chatham and, at times, The Georgia Conservancy and Coastal Citizens for a Clean Environment. I presume our views still coincide. But we have moved from Savannah to Atlanta since last I testified at a scoping hearing in Savannah and present this written statement as a concerned citizen.	
	Please see address change above.	
DD-1	I note with great satisfaction the declaration by the Environmental Protection Agency that the planned restart of the Savannah River Plant's Idle L-Reactor is "environmentally unsatisfactory." Interestingly, that was a conclusion reached more than a year ago by EPA staffers, but muzzled by the then top administrators of the Agency. We also thought so, and said so, ever since the proposal to reactivate a 1953 piece of nuclear machinery surfaced in 1980!	EPA's "environmentally unsatisfactory" rating is based primarily on a concern that no final agreement had been reached with the State of South Carolina on cooling-water discharges and a National Pollution Discharge Elimination System Permit. DOE is working with both the state and EPA to resolve these concerns. Also see the response to comment AA-1 regarding cooling-water mitigation alternatives.
DD-2	Furthermore, we do not believe the DEIS findings produced anything to assuage our anxieties about damages to be caused by super heated water discharges and escape of radioactive gasses.	L-Reactor direct cooling-water discharges to Steel Creek would be at about 73°C and, hence, would not be super-heated in the ordinary sense, although they would be above South Carolina

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DD-3	Bashear, according to UPI, did state, "the environmental impact statement is essentially OK, but a final EIS must be approved," we wonder if there is time left to produce an acceptable statement? Obviously EPA is as concerned as we are about ground water contamination, the discharge of heated effluent into Steel Creek and "uncertainties involving the disposal of various potential and actual hazardous wastes generated from reactor operations." We fail to see in the DEIS any signs of mitigation measures to correct the widely recognized L-Reactor deficiencies. There is passing mention of cooling towers and containment domes, but no indication they will be in place prior to reactivation. I personally will insist these measures be installed. I'm sure the League of Women voters will agree, as will other Georgia and South Carolina environmental groups. The very concept of rushing into reactivation without considering the warning of EPA and ignoring the wishes and concern of the majority citizenry of the SRP area, is foolish, perhaps disastrous. We hope this administration takes heed. Thank you. Sincerely, Lawrence D. Benedict	standards for discharge to Class B streams. Also see the response to comment AA-1 regarding cooling-water alternatives in this Final EIS. Airborne radionuclide releases from the Savannah River Plant are about a factor of 10 below the proposed new EPA standard and are thus not expected to be a major problem; a continuing effort is underway to reduce these releases. Also see the response to comment AJ-1 regarding groundwater contamination. Mitigation measures are discussed in detail in Section 4.4 of the EIS. See the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives, and the response to comment BF-7 regarding containment domes.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF EUGENE J. CARROLL, JR.		
Center for Defense Information 303 Capitol Gallery West 600 Maryland Avenue, S.W. Washington, D.C. 20024		
November 1, 1983		
Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, SC 29801		
Dear Mr. Sires:		
DE-1	The Center for Defense Information is unable to address in detail the important environmental issues surrounding restart of the Savannah River Plant's L-Reactor, but we can speak directly to the actual need for a fourth strategic materials production plant at Savannah River. Even setting aside for the moment very pertinent questions about the military utility of adding thousands of nuclear weapons to an already overburdened U.S. arsenal, CDI can identify no compelling need to restart the L-Reactor.	See the response to comment AB-8 regarding the need for material.
DE-2	Reductions in planned nuclear weapons production programs made over the last two years clearly obviate the 1980 decision to restart the L-Reactor. The planned number of Air-Launched Cruise Missiles has apparently been cut by more than 1,000. The number of MX warheads has been cut in half by 1,000. To date, Congress has foreclosed production of 1,000 155mm neutron artillery rounds. Production of 500 warheads for the Sentry anti-ballistic missile and another 500 for the Standard Missile-2 anti-aircraft weapon has been moved to the out-years. Although the Reagan Administration is still calling for an unconscionably large growth in the U.S. nuclear arsenal,	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	3,000 weapons have been cancelled outright and another 1,000 delayed since the initial decision to restart the L-Reactor.	
DE-3	At the same time, it is reported that higher levels of production at the P-, K-, and C-Reactors resulted in a 500-kilogram surplus of supergrade plutonium in FY 1982 and FY 1983. This plus planned introduction of more efficient Mark-15 production cores, put to rest the concerns raised in 1981 about a shortage of strategic materials to support the Reagan Administration nuclear buildup. Failure to obtain approval of the 155mm neutron artillery round and delay of the Sentry ABM, both heavy users of tritium, further reduce the requirement for new tritium production.	See the response to comment BL-20 regarding material needs as defined in the NWSM, and the response to comment BL-21 regarding production alternatives.
DE-4	It is difficult to square the Department of Energy's drive to restart the L-Reactor with the worry often aired by its officials that strategic materials production is too concentrated geographically. Current plans to restart the Purex Reprocessing Plant at the Hanford Reservation and build new production facilities at the Idaho National Engineering Facility certainly do more to meet these concerns than would restarting the L-Reactor.	Geographical distribution of defense nuclear material production facilities is one of a number of factors that is considered in the evaluation of future production capacity. However, restart of L-Reactor in combination with implementation of planned initiatives is necessary for meeting near-term defense nuclear material needs. There are no other viable options at other DOE sites that could provide the needed materials.
DE-5	Finally, if the Reagan Administration is truly committed to its assorted START and build-down proposals, the DOE will be able to reprocess more strategic materials from "built-down" warheads than it could ever need for a smaller number of new nuclear weapons.	See the response to comment BL-19 regarding utilization of material from retired weapons.

Sincerely,

Eugene J. Carroll, Jr.
Rear Admiral, USN (ret.)
Deputy Director

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF SUZANNE A. SHUMAN		
128C E. 60 Savannah, GA 31405 Oct. 28, 1983		
Representative Thomas:		
DF-1	As a concerned citizen, mother, and teacher, I am writing to you concerning the L-Reactor's E.I.S. I think the EIS conclusions are unacceptable. Please establish an oversight committee of the Savannah River Plant facility. I am also concerned about not having provisions for cooling towers or a containment dome.	See the response to comment BQ-2 regarding existing oversight mechanisms, the response to comment BF-7 regarding containment domes, and the responses to comments AA-1, AA-3, and AB-13 regarding cooling-water mitigation alternatives.
Thank you for your concern, and efforts.		
Sincerely,		
Suzanne A. Shuman		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF AMY G. DARDEN		
October 31, 1983		
Dear Representative Thomas:		
The Department of Energy's Draft Environmental Impact Statement, <u>L-Reactor Operation, Savannah River Plant</u> overlooks several significant points that I would like to bring to your attention.		
DG-1	In the thirty years of plant operations at SRP there has never been an independent study of the health and environmental effects of the reactors at SRP that was not conducted by, financed by, or based on data collected by the DuPont Company. DOE's EIS is overwhelmingly based on DuPont publications. The people who live in Georgia and South Carolina deserve to know what the health effects of SRP are; it appears that we will have to wait longer since no one in a position of authority seems concerned that an independent study has not been undertaken. According to the South Carolina Bureau of Vital Statistics infant mortality rates and cancer rates in counties adjacent to SRP are 4-10X higher than in other areas of the state. As every high school biology student learns, there is no safe dose of radiation. It takes only one radioactive particle, one cell, and one gene to start the cycle of cancer and genetic mutation.	See the responses to comments AV-8 and CG-1 regarding health effects and epidemiological studies.
DG-2	But at SRP's reactors there are no containment domes and no cooling towers. Is there any logic as to why reactors making weapons grade materials are not held to the same safety guidelines as commercial nuclear power plants? With its emissions of radioactive gases and cooling water the L-Reactor will have an impact on the health of human, plant, and animal populations in Georgia and South Carolina.	Estimates of atmospheric releases from L-Reactor and its support facilities are given in Sections 4.1.1.6, 4.1.2.1, and 5.1.2.2. These releases result in ambient air concentrations that fall within all applicable state and Federal guidelines. Also, see the response to comment BF-7 regarding containment domes, and the responses to comments AA-1, AA-3, and AB-13 regarding cooling-water mitigation alternatives.
DG-3	The DOE has also failed to find the solution to the problem of solid wastes disposal. Solid wastes are considered much safer than liquid radioactive wastes which are already leaking from containers into the Tuscaloosa aquifer. But are we prepared to	No liquid radioactive wastes have been found to have leaked into the Tuscaloosa Aquifer. As described in the EIS, some contamination of Tuscaloosa wells has occurred from nonradioactive degreasing agents; see the response to comment AJ-1.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	protect the public from those wastes over the enormous periods of time that must pass before the wastes lose their radioactivity? The SRP has been described as the "bomb that has already been dropped." As a biologist concerned with life and particularly with human life, I am appalled at the flagrant oversights in the EIS and the massive duping of the public by the Department of Energy. The L-Reactor was commissioned to make plutonium and tritium for nuclear warheads to be used in our nation's defense. When is someone going to defend the citizens against the bomb makers? I will appreciate your evaluation on the safety of life in our area if the L-Reactor startup proceeds in January 1984. Yours for a safe and healthy world, Amy G. Darden 7911-A Tybee Rd. Savannah, GA 31410	With respect to the disposal of high- and low-level radioactive waste see the responses to comments AV-2 and BA-5.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF DORETHEA SMITH		
Oct. 31, 1983		
Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801 Attn: EIS for L-Reactor Dear Mr. Sires, I'm very concerned about the environment we live in today, we have the Department of Energy (DOE) along with the Environmental Impact Statement. The L-Reactor Operation at the Savannah River Plant should be study very careful because we are talking about human being, and the environment which we live in.		
M-298 DH-1	The startup of the L-Reactor will increase by 33% the load on seepage basins currently leaking toxic chemical into fresh-water source for much of the Southeast. The amount of liquid high-level wastes produced at the Savannah River Plant will increase by 33%.	See the response to comment AJ-1 regarding the use of seepage basins and the responses to comments AV-2 and BA-5 regarding the disposal of high- and low-level radioactive waste.
DH-2	The Department of Energy plans involve the flushing of radioactive cesium into the Savannah River. This is not safe and I feel the startup of the L-Reactor should be avoided in South Carolina.	See the response to comment AA-2 regarding the relationship of radiocesium and radiocobalt concentrations to EPA drinking water standards.
DH-3	The Department of Energy facilities should be required to comply with federal and State Environmental Standards applicable to commercial reactor sites; and very serious steps be taken to avoid damage to the environment before startup. And if proving not to be safe for our environment that we live in, I urge you and others not to start up the L-Reactor in South Carolina for the production of plutonium.	See the responses to comments AF-1, BF-7 and BF-8 regarding the differences between SRP reactors and commercial light-water reactors, and the responses to comments AA-1, AA-3, and AF-2 regarding DOE's commitment to comply with all applicable Federal and state environmental regulations and to take all reasonable steps to mitigate impacts.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	I would like to have a copy of the Final Draft Environmental Impact Statement along with any other information you can share with me. Thanking you in advance for your assistance, Sincerely, Dorethea Smith	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

STATEMENT OF FRANCES HART

ENERGY
RESEARCH
FOUNDATION
2530 Devine Street
Suite 201
Columbia, South Carolina 29205

Frances Close Hart
Board Chairperson

John M. Lawson
Executive Director

Dear Mr. Sires,

I enclose a statement by Dr. George W. Rathjens of the Massachusetts Institute of Technology regarding the need for plutonium as it relates to the startup of the L-Reactor.

I submit this for the EIS record for Dr. Rathjens, along with a copy of his professional biography which I would like to put on the record with his statement.

The hearing seemed extremely well-organized, as usual, and thank you for allowing us to appear, and well as for your always prompt and pleasant help in our requests for information.

I look forward to seeing the final EIS.

Sincerely,

Frances Hart

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT BY DR. GEORGE WILLIAM RATHJENS November 1, 1983		
	I do not have the expertise, nor have I had the time, to review the parts of the Environmental Impact Statement that address the effect of reactivation of the L-Reactor on the environment. My impression is that a competent job has been done and that the statement fairly describes what might be expected. The unclassified version of the statement does not, however, provide enough information on alternative means of increasing plutonium and tritium production for me or, I believe, other readers, to judge whether its conclusions in this respect are sound. And most importantly, it is totally unconvincing in justifying the need for increased production of these materials. Indeed, it makes no attempt to do so, claiming that the relevant data, projections, etc., must be classified. This is the area I wish to address.	
D1-1	The initiative to increase production of plutonium was taken in 1980 after review of weapons stockpile needs by a high-level committee. Since then a great deal has happened that suggests that we will need less plutonium for new weapons than had been anticipated at that time and that more will be available from old weapons being retired from other sources. Specifically: 1. The programs for the MX missile and the air-launched cruise missile have been cut back. 2. The 1982 review of the ABM treaty has not resulted in any changes in the treaty and there is now no prospect of an early ballistic missile defense deployment. The Sentry ABM program has been cancelled. 3. The production of 155 mm artillery shells has been delayed.	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

M-301

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	4. A decision has been announced to withdraw 1400 nuclear warheads from Europe.	
DI-2	5. The Congress has refused to support continuation of the Clinch River Breeder program, which would have required large amounts of plutonium.	Requirements for the supply of fuel-grade plutonium to CRBR were not included in the determination of plutonium supply and demand in the Nuclear Weapons Stockpile Memoranda because this plutonium for CRBR would be obtained from sources outside the defense nuclear material complex. Material from sources under consideration (commercial spent fuel and purchases from foreign countries) would not be available to the weapons program because of existing law and restrictions expected to be imposed by the country providing the material. Furthermore (even if these restrictions did not exist), this plutonium could not be used for conversion to weapons-grade plutonium within a time frame that would affect the need for L-Reactor, because the Special Isotope Separation process is not expected to be available in 1990 and DOE has enough fuel-grade plutonium for blending during this period.
DI-3	With these changes there is not likely to be any need for re-activation of the L-Reactor in the near future, and possibly ever. In addition, any progress in arms control would very likely further reduce demand for plutonium. In this connection it should be noted that: 1. The concept of a "build down" of nuclear weapons requiring that two old warheads be given up for each new one acquired has gained increased acceptance, and a variant of it is now reflected in the President's arms control proposal - a variant that would require that the rate of retirement of strategic weapons be at least five percent per year.	See the response to comment DI-1 regarding the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
2.	The U.S. remains committed to giving up or limiting the deployment of intermediate range nuclear weapons in Europe if a suitable agreement can be reached with the Soviet Union.	Finally, some of the nuclear weapons programs that would require new warheads that have been approved by the President can, and should be, seriously questioned. Examples are the MX and the enhanced radiation weapons, or neutron bombs.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	GEORGE WILLIAM RATHJENS	
	Born (b) (6) in Fairbanks, Alaska Yale University, B.S., 1946 University of California, Ph.D. (Chemistry), 1951 Columbia University Instructor, Chemistry, 1950-1953 Weapons Systems Evaluation Group, Office of the Secretary of Defense, U.S. Department of Defense Scientific Advisor, 1953-1958 Harvard University Fellowship (Office of Naval Research), 1958-1959 Office of the Special Assistant to the President (Science and Technology) Member of the Staff, 1959-1960 Advanced Research Projects Agency, U.S. Department of Defense Chief Scientist, 1960-1961 Deputy Director, 1961-1962 United States Arms Control and Disarmament Agency Deputy Assistant Director, Science and Technology, 1962-1964 Special Assistant to the Director, 1964-1965 Institute for Defense Analyses Director, Weapons Systems Evaluation Division, 1965-1967 Director, Systems Evaluation Division, 1967-1968 Massachusetts Institute of Technology Department of Political Science, Visiting Professor, July 1968-July 1969 Department of Political Science, Professor, July 1969-present United States Department of State Deputy U.S. Representative for Non-Proliferation and Chairman, Management Committee for American Participation in the International Nuclear Fuel Cycle Evaluation, 1979-1980	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Dr. Rathjens graduated from Yale University in 1946 with a B.S. in Chemistry, and received a Ph.D. from the University of California in 1951, also in chemistry. He taught, and continued with research on molecular structure, at Columbia University from 1950-1953. He left Columbia University in 1953 to join the staff of the Weapons Systems Evaluation Group of the Department of Defense. With the exception of one year (1958-1959), during which he did research in physical chemistry at Harvard, he remained in Washington for the next 15 years in positions involving: - the analysis of military research and development, and weapons acquisition programs; - the development of national security policy, including arms control policy, in areas where technical problems were of importance; - the administration of the work of others so involved and of military research and development programs.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	STATEMENT OF JOHN WINTHROP	
	JOHN WINTHROP & CO., INC. 140 Broadway New York, New York 10005 (212) 480-9080	
	November 4, 1983	
	Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801	
	Dear Mr. Sires:	
M-306 DJ-1	As a landowner in South Carolina and as an American citizen, I am deeply concerned that the DOE facilities on the Savannah River and elsewhere be required to comply with all environmental standards applicable to commercial reactor sites. Furthermore, I hope I am correct in assuming that steps are being taken to avoid damage to the environment BEFORE startup. Please let me know if I can be helpful in furthering these important objectives.	See the responses to comments BF-7 and BF-8 regarding the differences between SRP reactors and commercial light-water reactors, and the responses to comments AA-1, AA-3, and AF-2 regarding DOE's commitment to comply with all applicable Federal and state environmental protection regulations and to take all reasonable steps to mitigate impacts.
	Sincerely yours,	
	John Winthrop	
	JW:ss	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	STATEMENT OF B. G. CLOYD BY W. H. RICE, JR.	
	U.S. Department of Transportation Federal Highway Administration South Carolina Division Office 1835 Assembly Street Suite 758 Columbia, South Carolina 29201 November 8, 1983	
	Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P. O. Box A Aiken, SC 29801	
	Dear Mr Sires:	
	Subject: Draft Environmental Impact Statement - "L-Reactor Operation, Savannah River Plant, Aiken, South Carolina" (DOE/EIS-0108D)	
	Reference is made to the draft EIS and your letter of September 23, 1983. Thank you for the opportunity to comment on the document. We do not foresee any significant effect on the highway system as a result of the L-Reactor operation. We furnished a copy of the draft to the South Carolina Department of Highways and Public Transportation and inquired if they wished us to include any comments with our response. They advised they did not have any comment for us to include.	
	Although we see no significant effect, we do list the following comments for your consideration:	
DK-1	Shipper's safety reliance rests primarily in packaging (DOT Specification) and in specially trained escort personnel. This is in keeping with usual procedures involving high risk transportation and appears adequate on its surface.	DOE complies with DOT packaging and escort regulations regarding the transportation of high-risk materials.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DK-2	Accident risk is hypothetical since there is no prior history of accidental release of material contained in Type B vessels.	DOE takes credit for the safety record of type-B vessels in their shipping procedures, and their safety and impact assessments.
DK-3	We would be more concerned with incoming shipments of flammable products such as gasoline. If outside vendors are used, what control is exercised to assure compliance with Title 49 over these vendors? Are cargo tanks routinely examined on entry to SRP? What controls are exercised in the off-loading of products? The statement is silent in this regard.	Agreements, contracts, or purchase orders issued by DOE or its prime contractor for vendor transport services include requirements to operate within all DOT and other agency regulations. The performance of these vendors is routinely monitored to assure compliance with requirements. DOE-SR and SRP implementation plans include procedures for proper identification and examination of all shipments, including cargo tanks, entering the SRP. These plans also include procedures for off-loading and handling of various classes of materials and containers commensurate with their potential hazard. These procedures are part of the general safety practices of the Plant, but include special procedures for handling and storing high-level materials.

Sincerely yours,

B. G. Cloyd
Division Administrator

By W. H. Rice, Jr.
District Engineer

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF H. WAYNE BEAM		
South Carolina Coastal Council James M. Waddell, Jr., Chairman H. Wayne Beam, Ph.D, Executive Director November 10, 1983		
Mr. M. J. Sires, III Assistant Manager for Health, Safety, Environment U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, South Carolina 29801		
Dear Mr. Sires:		
The S.C. Coastal Council remains concerned over the environmental impacts of the proposed re-start of the L-Reactor.		
DL-1	The staff has reviewed the DEIS which shows that the Beaufort and Jasper Counties portion of the coastal zone will be affected through the use of the Savannah River for drinking water and the consumption of fish and shellfish from the estuary. It is our opinion that the DEIS is not detailed enough, due to a lack of study, on the impacts of radiation from the L-Reactor and the other Savannah River Plant facilities on the estuarine environment and man's use of it.	The EIS contains an extensive discussion of radiological and ecological impacts, including cumulative impacts, due to the proposed restart of L-Reactor. These discussions are specifically contained in Sections 4.1.1.4, 4.1.2, 4.4.2, 5.1.2, 5.2.4, 5.2.5, 5.2.6, 5.2.7, and Appendixes B, C, D, and I of the EIS. As contained in the EIS, the exposure of the public to radiation resulting from L-Area operation would be minimal compared to applicable standards or the exposure from natural or other man-made radiation sources.
DL-2	The cumulative effect of all of the Savannah River Plant's operations on the estuary should be detailed so that the level of impact and health risk of the proposed L-Reactor restart can be fairly judged. The information presented to date fails to provide a comprehensive view of the Savannah River Plant radiological effects on South Carolina's coastal zone. The proposed effects of the L-Reactor should not be reviewed in such a vacuum.	Section 5.2 of the EIS describes the cumulative effects of present and proposed SRP facilities and those of other nuclear operations in the vicinity of SRP.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DL-3	It is our recommendation that the restart of the L-Reactor be delayed pending initiation of studies that will monitor the radiological effects of the Savannah River Plant's operation on the estuarine environment. In this way the actual risk to the users of South Carolina's coastal resources in the affected area from current and proposed Savannah River Plant operations can be known and evaluated. Thank you for the opportunity to comment.	The Savannah River Plant has had a continuous comprehensive environmental radiological monitoring program since before startup of the Plant in 1952. Releases from the entire Savannah River Plant are controlled to the extent practicable. The amounts of radioactive releases and their impacts on the population within an 80-kilometer radius and on downstream consumers of Savannah River water are published in an annual series of reports available to the public, entitled: <u>Environmental Monitoring in the Vicinity of the Savannah River Plant</u>. The most recent of these reports, for 1982, is DOE document DPSPU-83-30-1.

In addition to the monitoring programs conducted by the Savannah River Plant, the States of South Carolina and Georgia and other Federal agencies also independently monitor releases. These monitoring programs are discussed in Chapter 6 of this final EIS. The current reports documenting the radiation monitoring programs of the states are Environmental Radiation Surveillance Report, Summer 1980-Summer 1982, Georgia Department of Natural Resources, and Nuclear Facility Monitoring, South Carolina Department of Health and Environmental Control.

Sincerely,

H. Wayne Beam
Executive Director

HWB:dms/0018d

cc: Senator James M. Waddell, Jr.
Mr. Duncan C. Newkirk

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF CAROLYN A. TUCKER		
November 3, 1983 403 Tatrall St. Savannah, GA 31401		
Representative Lindsay Thomas 427 Cannon Office Building House of Representatives Washington, DC 20515		
Dear Representative Lindsay Thomas:		
DM-1	I am writing to you because I am quite concerned about the impending re-start of the L-Reactor at the Savannah River Plant. Despite assurances of the safety of the reactor and the need for reactivating it that are stated in the Environmental Assessment and the draft Environmental Impact Statement, I am not convinced of either the safety or of the need. There are no plans for a containment dome or for cooling towers. A part of any radioactivity released, either planned or accidental, will end up in Savannah as well as in other parts of Georgia.	See the response to comment AB-2 regarding information in this EIS on need, the response to comment BF-7 regarding containment domes, and the responses to comments AA-1, AA-3, and AB-13 regarding cooling-water mitigation alternatives and DOE's commitment to comply with all applicable Federal and state environmental protection regulations.
DM-2	In addition is there a real need for the additional plutonium to be produced by the L-Reactor?	See the responses to comments AB-3, AB-2, BL-15, and BL-18 regarding the need for additional materials.
DM-3	I feel that it is absolutely necessary for an <u>independent</u> oversight committee to be established to review the L-Reactor as well as the other facilities at the Savannah River Plant.	See the response to comment BQ-2 regarding existing oversight mechanisms.
I know you are also concerned about the quality of the public health and the environment. Please use your influence to help protect these things.		
Sincerely,		
Carolyn A. Tucker		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

STATEMENT OF JAN BEYEA

National Audubon Society
950 Third Avenue
New York, N.Y. 10022
(212) 832-3200
CABLE: NATAUDUBON

October 25, 1983

Mr. M. J. Sires, III
Assistant Manager for Health
Safety and Environment
U. S. Department of Energy
Savannah River Operations Office
P. O. Box A
Aiken, SC 29801

Re: Comments on the D.E.I.S. Prepared for the Savannah River
L-Reactor

Dear Mr. Sires:

I have reviewed the accident analysis for the Savannah River
L-Reactor presented in the Draft Environmental Impact
Statement* and related documents.**

*U.S. Department of Energy, "Draft Environmental Impact
Statement," L-Reactor Operation Savannah River Plant (Report
DOE/EIS-01080, P. O. Box A, Aiken, South Carolina 29801,
September 1983).

**a. William S. Durant, Robert J. Brown, "Analysis of
Postulated Core Meltdown of an SRP Reactor" (deleted version of
final report, DPST-70-433, E. I. DuPont de Nemours & Company,
Savannah River Laboratory, Aiken, South Carolina 29801, October
1970).

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	I find the following deficiencies:	
DN-1	1. The analysis considers only extremely optimistic accident sequences. In fact, only accidents much less severe than the Three Mile Island accident are considered credible. 2. No accident sequences are presented that would challenge the confinement system, despite the fact that the capacity of the system for handling escaping steam is limited. My specific comments are as follows:	See the responses to comments DN-2 and DN-3.
DN-2	A) <u>Accidents in which partial cooling of the core takes place are not considered.</u> TMI was such an accident. In fact, although there was little actual core melting at TMI, 70 percent of the noble gases and at least 50 percent of the radiiodine escaped from the fuel.* Any impact analyses for the L-Reactor which does not consider such a challenge to the confinement system cannot be considered credible. ***b. J. P. Church et al., "Safety Analysis of Savannah River Production Reactor Operation" (deleted report, DPSTSA-100-1, Rev 9/83, E. I. DuPont de Nemours & Company, Savannah River Laboratory, Aiken, South Carolina 29808, September 1983). c. S. P. Tinnes, "Airborne Activity Confinement System Performance First Five Hours after Reactor Accident" (Memorandum to G. F. Merz, DPST-79-555, Technical Division, Savannah River Laboratory, November 1, 1979). d. E. Nomm and H. P. Olson, "Confinement Heat Removal System Proposals" (Memorandum to G. F. Merz, DPST-74-401, Technical Division, Savannah River Laboratory, October 1976). *Bishop, W. N., Nitti, D. A., Jacob, N. P., Daniel, J. A., "Fission Product Release from the Fuel Following the TMI-2 Accident," in <u>Proceedings of the American Nuclear Society/European Nuclear Society Topical Meeting: Volume 1 Thermal Reactor Safety</u> (Knoxville, Tennessee, April 6-9, 1980).	The release of radiiodine from the fuel to the coolant in the TMI-2 accident is largely irrelevant to an assessment of the potential for offsite exposures resulting from a similar accident at the L-Reactor. The relevant factor is the release from the coolant to the containment atmosphere at TMI-2. That release, about 1 percent of the core inventory of radiiodines and all of the noble gas inventory (Pelletier, C.A., et al., 1983. <u>Preliminary Source Term and Inventory Assessment for TMI-2.</u>), has been assumed to have occurred into the L-Reactor confinement and the resulting doses have been calculated to be about 900 millirem to the whole body and about 960 millirem to the thyroid of the maximum hypothetical individual. Direct comparisons of the TMI accident with postulated accidents for SRP reactors are not appropriate because of major differences in the design characteristics of the two types of reactors. Other characteristics of particular importance include the design of the fuel itself. SRP reactor fuel is a metal or metal alloy; volatile and gaseous fission products within the fuel are released only if the fuel itself melts. This is in contrast to LWR power reactor fuel such as the TMI fuel. LWR oxide fuel pellets are relatively porous and allow volatile and gaseous fission products to migrate within the fuel rod. These gaseous fission products are retained within the fuel rod by cladding. At TMI relatively little core melted. However, embrittlement of the cladding occurred while the core was uncovered. When cooling was restored to the core, the thermal shock apparently ruptured embrittled cladding. At that point, the containment of the gaseous fission products by the cladding was breached and about 60% of the inventory of

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	And since the L-Reactor confinement system, unlike the system of TMI, provides minimal holdup of noble gases, a 70 percent release of noble gases to the environment is a credible event. The regulatory and public health significance of a 70 percent noble gas release should be analyzed in the final impact statement. The retention of radiiodine by the confinement system would be much better than for noble gases in a TMI-like accident, because the filtration system at the L-Reactor, if working, would trap a large percentage of radiiodine released from the fuel. Perhaps only 1/1000th of the material entering the filters would escape. Thus, 35 thousand curies of radiiodine might be released, not 35 million curies that could be released in the absence of the filters. In any case, a release of 35,000 curies should be analyzed as part of the final impact statement. Furthermore, accident sequences that might damage the filtration system should also be considered. (See next section.)	noble gases was released to the reactor containment. SRP fuel does not behave in this manner. Instead, if an assembly were to partially melt, then fission products would be released only from the portion of the fuel that melted. In a loss-of-coolant accident in which less than 1 percent of the core would be damaged, no more than 1 percent of the inventory of gaseous fission products would be released from the fuel.
DN-3	B) <u>The L-Reactor confinement system may not be capable of handling a partial-cooling accident in which emergency cooling water is restricted by steam binding, as at TMI.</u> The L-Reactor confinement system is primitive in comparison with the civilian power reactors. The system relies upon exhaust fans to both force escaping radioactivity through filters and to prevent overheating of the filters. Yet, the amount of steam that might reasonably be expected to be driven through the exhaust fans during a severe core overheating accident could conceivably overload them. For instance, consider an accident in which <u>emergency cooling water is being vaporized to steam.</u> Although the vaporization process could well be sufficient to carry off the residual heat from the reactor, thereby preventing it from melting, copious amounts of steam would be produced. In fact, the steam produced in carrying off only 50 megawatts of core power would probably be sufficient to	Specific experiments have determined the power levels for which steam binding would prevent an individual assembly from receiving coolant from the reactor plenum in the event of a reactor accident. This steam binding only affects the assemblies whose power level exceeds this critical value. Steam from one assembly will not adversely affect flow to adjacent assemblies. The reactor power level is limited so that in the event of hypothetical maximum-rate leak of coolant, the resultant damage to the reactor core is no more than 1 percent. For all credible loss-of-coolant accidents no fuel melting is anticipated even when assuming failure of the most active component in the emergency cooling system. Consequently, steam is produced only in a few assemblies (all the rest have sufficient coolant to prevent steam formation). Ten seconds after a reactor shutdown, the power of the reactor has decayed to approximately 350MW. A maximum of approximately 1 percent (corresponding to the 1

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	overload the exhaust fans.* Yet, the L-Reactor could require much more than 50 megawatts of cooling under loss-of-cooling conditions. For instance, experimental data shows that, 10 seconds after scram, the L-Reactor would still be putting out 350 megawatts of power (assuming it had been operating before scram at maximum power of 2900 megawatts).** Experimental data concerning the decay heat rate beyond 10 seconds does not exist*** and the theoretical function used in L-Reactor safety analyses for times greater than 10 seconds is not given in the references available. Consequently, it is not possible to determine for this brief review the length of time that	percent of the core that may be damaged) of this power (3.5 MW) could be converted to steam and even formation of this amount of steam is temporary and localized within assemblies. Significant if not total quenching of this steam would occur before it reaches the reactor process room. If steam binding within an assembly ultimately leads to melting of the assembly, the molten material would be quenched in the moderator tank and no more steam would be formed. The maximum theoretical amount of steam produced under the above conditions would not challenge the integrity of the airborne confinement system. All credible accidents and some accidents not considered credible are analyzed to assure protection of the confinement system. None of the credible accidents result in enough steam formation to challenge the confinement system.
M-315	*When two fans are operating, the exhaust system can remove steam at the rate of 60 cubic meters per second (m^3/sec). [DEIS, op. cit., Volume 2, Figure G-1, P. G-15.] This figure might be cut to 36 m^3/sec. due to steam "binding." [Durant and Brown, op. cit., P. 58.] One operating fan appears to be able to exhaust gas at the rate of 35 m^3/sec. [S. P. Tinnes, op. cit., P. 6.] Consequently, it is reasonable to pick 35 m^3/sec. as a representative value under actual operating conditions. 35 m^3/sec. of escaping steam would carry off 50 megawatts of decay heat. Analysis: According to standard steam tables, the volume of steam at 212°F is 27 ft^3/lb and the energy required to convert water to steam is 1000 Btu/lb. [E.g., Handbook of Chemistry and Physics, Chemical Rubber Company, Cleveland, Ohio.] Thus, each cubic foot of steam carries with it 37 Btu in latent heat, which is equivalent to 1.4 million joules per cubic meter. Therefore, an exhaust rate of 35 m^3/sec of steam would remove 50 megawatts of power. **Church et al., op. cit., Figure 15-18, p. 15-48. ***Church et al., op. cit., p. 15-51.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	escaping steam would overwhelm the exhaust fans. However, the time period could well be in excess of several hours.## During that several hour period the pressure inside the reactor complex would become positive, driving steam and possibly radiolodine out through unfiltered paths, including the air inlet tunnel, i.e., the filters would be bypassed. Exactly how much radiolodine would be released from the fuel during this initial period is not clear, but based on TMI, it most likely would be more than the amount assumed to escape to the environment over the entire accident through the filter pathway analyzed in the DEIS. (Even minor damage could release radiolodine.) Of equal seriousness is the impact on the fans of positive pressure. The fans might be damaged, or if the pressure rose to between 0.4 and 2 pounds per square inch, the fan housings would burst, rendering the fans useless.## And without operating fans, the exhaust filters would overheat, compromising their ability to retain radiolodine* released at any time during the accident. Thus, a radiolodine release much larger than 35,000 curies would become credible. For all these reasons, it appears to me that the optimistic assumptions made in the DEIS concerning the adequacy of the L-Reactor confinement system are highly questionable under plausible accident sequences.	
	##For a conventional power reactor, the time would be about 25 minutes. [Anthony Nero, Jr., <u>A Guidebook to Nuclear Reactors</u>, University of California Press, Berkeley, 1979, p. 54.] However, the decay heat for the L-Reactor appears (at least initially) to be a greater percentage of the rated power than for a civilian reactor. ##The fans have been estimated to fail at an overpressure somewhere between 0.4 to 2 psig [Durant and Brown, op. cit., p. 58]. *E. Nomm and H. P. Olson, op. cit.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DN-4	In addition to concerns about the assumed release of fission products in credible accidents, I find the back up electrical system for the exhaust fans to be inadequate. In accident sequences in which electrical power is lost, the current confinement system relies on diesel generators. Yet diesel generators are notorious for failure to start. If the L-Reactor should ever be operated, an additional generator to power the fans driven by steam escaping from the damaged reactor should be installed to add an additional margin of safety.	There are three redundant sources of electrical power to the confinement system exhaust fans. Two of three fans are normally online although only one is necessary to maintain negative pressure in the reactor process area. A loss of normal electrical power to the exhaust fans would not cause an accident that would require the use of the fans. In any event, emergency power to the exhaust fans is available from both (1) diesel generators that supply emergency power to the reactor building and (2) dedicated diesel generators that supply power to backup motors for the fans. Based on test data explicitly for these generators, the probability that, if required, emergency power will not be available to at least one fan is less than 5×10^{-6} per demand, and the probability that there will not be emergency power to at least two fans is less than 4×10^{-6} per demand. The probability of these failures concurrent with loss-of-normal power from either of two substations is so small as to be essentially zero. The suggestion to have an additional generator driven by steam escaping from a damaged reactor is not applicable. In addition to the lack of need for an additional generator, it would be poor design practice to base the operation of a protection system upon the occurrence and consequence of the very accident it is designed to protect against.
	Sincerely, Jan Beyea, Ph.D. Senior Energy Scientist	
	JB:db cc Carlyle Blakeney	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF GEORGE P. LUPTON, M.D.		
8 November 1983 2431 Terrace Way Columbia, SC 29205		
Mr. Melvin J. Sires III U.S. Dept. of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801 ATTN: EIS for L-Reactor		
Dear Mr. Sires:		
As a concerned U.S. and South Carolina citizen I am writing in reference to the proposed re-activation of the L-Reactor at the Savannah River Plant. I am a physician very worried about the health and environmental consequences that the proposed reactivation may produce.		
DO-1	In order to make clear my concerns I am demanding that DOE facilities be required to comply with Federal and state environmental standards applicable to commercial reactor sites.	See the responses to comments AA-3, AF-1, and BF-7 regarding DOE's commitment to comply with applicable federal and state regulations and the differences between SRP reactors and commercial light-water reactors.
DO-2	I also urge that every possible step be taken to avoid damage to the environment and possible adverse affects on the human population in that area of S.C. and Georgia before the L-Reactor has become reactivated. I am displeased with the original DOE environmental assessment that was performed. I urge you to consider the well-intentioned and very significant facts recently re-emphasized about the adverse affects of the L-Reactor on the marshlands and water supplies to a large human population. Let us not place the manufacture of weapons of destruction ahead of the safety of our citizens and the preservation of the planet.	See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable federal and state regulations and to take all reasonable steps to mitigate impacts.
Sincerely yours,		
George P. Lupton, M.D.		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF WILLIAM JH CALDICOTT MB, BS		
November 7, 1983		
Mr. M. J. Sires III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, South Carolina 29801 Dear Mr. Sires: I wish to submit comments on the preparation of the Environmental Impact Statement (EIS) for the proposed recommissioning of the L-Reactor at the Savannah River Plant.		
M-319 DP-1	The EIS process is incomplete without definition of the need for the product of the L-Reactor, namely, additional nuclear weapons-grade material. It is self-evident that no risk to the public and to the environment is justified if the product of the reactor is superfluous, or imposes extreme and totally unacceptable hazards. The public has a right to be informed about all the risks to them and their environment, including those from the nuclear weapons that will be manufactured from the plutonium and tritium produced in the L-Reactor.	See the responses to comments AB-2 and AB-3 regarding the need for defense nuclear material.
DP-2	A recently completed study of the environmental impact of the use of nuclear weapons, conducted by Drs. Carl Sagan, Paul Erhlich et al., the results of which have been confirmed by thousands of scientists in this country and around the world, including the Soviet Union, has shed new and important light on this subject (Parade Magazine, Sunday October 30, 1983 [to be published in detail in "Science"]). It has shown that with the use of only a small fraction (10 percent, or less) of the existing strategic arsenals of the US and USSR, all life on earth may be destroyed. Currently the two arsenals contain a total of about 13,000 megatons of explosive capacity. It has been recommended as a matter of urgency, in light of the above findings, that the combined arsenals be reduced to levels below	These comments are outside the scope of the EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	the threshold for these catastrophic environmental effects, which is thought to be in the order of 1,000 megatons. The atmospheric effects of multiple nuclear explosions would include an extended period of darkness (lasting for weeks, and possibly months), caused by the injection of dust and debris into the atmosphere by multiple nuclear ground-burst explosions, and photochemical smog from fire-storms. The darkness would stop photosynthesis, killing animals and humans which are all dependent on plant life. It would also induce dramatic cooling, probably to between -25 and -50 degrees F in the northern hemisphere: the temperature differential would force these changes on the southern hemisphere also. As the atmosphere cleared, lethal levels of ultraviolet radiation would reach the earth's surface because of ozone depletion. The study also showed that the levels of radiation at the earth's surface would be higher than previously estimated, and extremely threatening to human existence. The above information adds weight to the conclusions of experimental biologists, and the medical and scientific communities of this country, as expressed in resolutions of their national societies. For example, the Federation of American Societies for Experimental Biology (FASEB), with a total membership of 18,267 scientists, and the American Association for the Advancement of Science (AAAS), with a membership in excess of 25,000, passed resolutions outlining the dangers of nuclear weapons and calling for both an end to the nuclear arms race, and increased efforts dedicated to the pursuit of arms reductions negotiations. In light of this knowledge, the possession by any country of an arsenal of nuclear weapons beyond the capacity to destroy all life on earth must be seen as a reckless disregard for all life. Both the US and the USSR currently have such dangerous excess capacities. The L-Reactor will be used to increase the present US nuclear stock-pile and as such is a real and lethal danger to all life on this planet. How can an EIS seriously concern itself with the environment if the most important environmental impacts are ruled as classified, and excluded from the public debate? Obviously it cannot.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	It is critical for the integrity of this enquiry, and the safety of the people of this region, the nation, and the world that the restrictions of classification be lifted, so that the wisdom of all the people can be applied to their collective survival. Nothing less is conscionable in a free and democratic society.	
	Department of Radiology Children's Hospital Medical Center 300 Longwood Avenue Boston, MA 02115	Yours Faithfully, William JH Caldicott MB,BS Assistant Prof. Radiology, Harvard Medical School

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	STATEMENT OF TIMOTHY F. ROGERS South Carolina House of Representatives P.O. Box 11867 Columbia SC 29211 Telephone 758-5240 November 10, 1983 Mr. M. J. Sires Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, SC 29801 Dear Mr. Sires: I would like to submit these comments for the record concerning the startup of the Savannah River Plant's L-Reactor, and the draft environmental impact statement. Not being a technical expert, I am not going to comment specifically on the accuracy or completeness of the draft's treatment of environmental areas. Rather, I will comment in general about assumptions which appear to be made in DOE's planning for the L-Reactor.	
DQ-1	Public pronouncements from DOE in recent weeks refer to a January startup date. The draft EIS dismisses mitigation alternatives because to protect our environment is supposedly impossible due to "production schedule" demands.	The purpose of the EIS is to evaluate the environmental consequences of the proposed restart of L-Reactor. In accordance with the Council on Environmental Quality's regulations implementing the procedural provisions of NEPA, the Department's preferred alternatives (including mitigation alternatives) are identified in this final EIS. The Record of Decision on this EIS will state the alternatives to be implemented. The Record of Decision will address the alternatives considered in reaching the decision, environmentally preferable alternatives, and preferences for alternatives based on technical, economic, and statutory missions of the agency, and whether all practicable means to avoid environmental effects from the selected alternative have been adopted.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DQ-2	This claim, supposedly founded on information inaccessible to the public, has been called into question recently by experts in the field of strategic policy, such as Dr. George Rathjens, whose knowledge cannot be disputed. According to Dr. Rathjens and others, changes in weapons systems since the 1980 decision to restart the reactor, and other alternative production possibilities, make any claim that the immediate startup is essential appear to be absurd. I would request that the final EIS deal with this question in a more thorough way. I do not believe that a general explanation in this area would present a national security threat. Given that the information appears to show that a delay in L-Reactor startup for three years would have no effect on national security (according to the testimony of Dr. Thomas B. Cochran of the Natural Resources Defense Council) I would suggest that the following goals be reached before startup:	As indicated in Section 1.1.1 and Appendix A (classified) of the EIS, the defense nuclear material requirements of the FY 1984-1989 Nuclear Weapon Stockpile Memorandum support the need to restart L-Reactor as soon as practicable. In addition, Section 2.1.3 of the EIS summarizes the fact that implementation of partial production options that would provide the greatest material production would only provide a small fraction of needed defense nuclear materials that could be produced by L-Reactor. Specific response to the comments of Dr. Rathjens and Dr. Cochran are contained in this Appendix under comment letters "DI" and "BL."
DQ-3	1) The phaseout of all seepage basins on site, including those in the support facility areas. Seepage basins for waste disposal are not acceptable environmental practice, and to increase the load on these basins before dealing with already severe groundwater contamination should be avoided.	As discussed in Chapter 5 of this EIS, the incremental L-Reactor impacts due to the use of seepage basins are expected to be minor. The proposed restart of L-Reactor is independent of the continued use of these seepage basins in that the seepage basins in the A-, M-, F-, and H-Areas are currently being used in support of other operations that are not within the scope of this EIS. DOE is committed to perform mitigative actions at SRP to reduce pollutants released to the ground water and to establish with the State of South Carolina a mutually agreed-on compliance schedule. The State of South Carolina (SCDHEC), U.S. Geological Survey, and Environmental Protection Agency are reviewing the detailed ground-water monitoring being performed at SRP to track the movement of the chlorinated hydrocarbon plume from M-Area operations (see Sections 5.1.1.2 and F.5.4) and to provide information for cleanup operations. These agencies are also reviewing proposed plans for impeding the growth of the contaminant plume and for removing the chlorinated hydrocarbons with a combination of recovery wells, a large air stripper (to be permitted by SCDHEC), and an injection well and/or spray irrigation system, if required. As noted in Section F.6, the SRP ground-water management and protection plan will be the subject of a separate NEPA review.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DQ-4	2) The implementation of some sort of cooling water discharge alternative to direct discharge into Steel Creek. Any alternative chosen should comply with state thermal standards before startup. Although it is understandable that operating reactors be allowed to come into compliance over a period of time, it is not acceptable to start up the L-Reactor, incur severe environmental damage, and put into place mitigation measures at some time in the future.	Section 4.4.2 of the EIS, which discusses cooling-water mitigation alternatives, has been revised based on public comments received on the draft EIS. Specifically, Section 4.4.2 has been revised to provide a detailed discussion of additional combinations of various cooling-water. In Section 4.4.2, each of the cooling-water mitigation systems is evaluated for attaining the thermal discharge limits of the State of South Carolina. Section 4.4.2 and a revised Appendix I, Floodplain/Wetland Assessment, discuss the wetland impacts of each of the systems considered.
DQ-5	3) The implementation of some sort of improved safety features which would bring the L-Reactor into compliance with standards demanded of commercial reactors, including those having to do with possible dangers to the public in the case of a severe accident. In general, I believe that the reactors - and all the facilities at the Savannah River Plant - should comply strictly with all regulations which apply to commercial reactors. And the Department of Energy should obey all laws and regulations which a commercial industry would face.	The Department of Energy has been reviewing and evaluating alternative cooling-water systems for L-Reactor. Based on these reviews and evaluations, and consultations with the representatives of the State of South Carolina regarding a mutually agreed upon compliance approach, a preferred cooling-water mitigation alternative is identified in this EIS. This preferred cooling-water alternative is to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in the lake. The Record of Decision prepared by the Department on this EIS will state the cooling-water mitigation measures that will be taken which will allow L-Reactor operation to be in compliance with the conditions of an NPDES permit to be issued by the State of South Carolina. Chapter 7 of the EIS presents the Federal and state environmental protection regulations that are applicable to the restart of L-Reactor. The restart of L-Reactor will comply with all of these regulations. For example, the proposed restart of L-Reactor will be in compliance with an NPDES permit issued by the State of South Carolina, and the restart of L-Reactor will be in compliance with DOE radiation protection standards that are comparable to those of the Nuclear Regulatory Commission (10 CFR 20) for a production facility (i.e., 500 millirem to the whole body in any one calendar year). With respect to engineered safety features such as a containment dome, the need for specific engineered safety features is based upon limiting potential radiological consequences. The potential radiological consequences are related to the design and operation of the specific type of reactor being considered; for example, the Fort St. Vrain reactor, which is a gas-cooled

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DQ-6	It is simply not sufficient to respond that national security demands a certain schedule - with no explanation in the face of increasing evidence that such is not the case - and continue to contaminate our environment. The toxic pollution of the Tuscaloosa Aquifer is a threat to our security perhaps more immediate than any we face if the L-Reactor startup is delayed. Thank you. Sincerely, Timothy F. Rogers TFR/rhl A54	commercial reactor in Colorado, has no containment dome and was licensed for operation by the NRC. See the responses to comments DQ-1 through DQ-5.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	STATEMENT OF DANIEL L. CHILDERS University of South Carolina Columbia, SC 29208 Marine Science Program (803) 777-2692 November 10, 1983 Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, SC 29801 Dear Mr. Sires: As a part of the public comment process provided for by the National Environmental Policy Act of 1969, this letter is directed at the draft Environmental Impact Statement (Draft EIS) prepared for the Savannah River Plant L-Reactor (DOE/EIS-0108D). My comments are both general--regarding the extensive loss of valuable wetlands and bottomland forests, and the adverse and possibly illegal effects on wildlife--and specific--regarding the failure of the Draft EIS to establish ecosystem bounds which would allow adequate study of large scale impacts of the L-Reactor operation. I am currently a masters degree candidate in the Marine Science Program at the University of South Carolina, Columbia, SC. My training is in ecosystems ecology, with particular emphasis on wetlands, and I am presently working on the modeling of salt marsh ecosystems. This letter contains my interpretations, comments, and recommendations only. I do not represent the University of South Carolina, the Marine Science Program, or any person affiliated with either.	
DR-1	There are a number of environmentally devastating effects that the L-Reactor restart would have on the Steel Creek ecosystem. It is unfortunate, and perhaps illegal, that these destructive	Sections 3.6.1, 4.1.1.4, 5.2.4.1, and Appendixes C and I address the impacts to wetlands from the L-Reactor reference case thermal discharge. Section 4.4.2 and Appendix I address

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
M-327	consequences have been essentially ignored as "inevitable" by the Department of Energy. Among the effects to which I am referring, one of the most significant is the immediate loss of nearly 1000 acres of freshwater wetlands and bottomland forests. By itself, this prospect is tragic. To date, over half of the 215 million acres of wetlands once found in the contiguous United States have been lost, and presently over 485,000 acres are lost every year. Clearly, the loss of the Steel Creek wetlands must be avoided. Beyond aesthetic considerations, these wetlands are crucial to the environmental stability and ecological balance of the surrounding ecosystem. They are intricately linked to the reduction of hydrologic storm effects and to the efficient removal of nutrients and sediments from the water column. These wetlands also provide critical habitat to a wide diversity of wildlife--vertebrate and invertebrate. Habitat interspersed and isolation from public hunting make the Steel Creek delta and Savannah River Swamp important sanctuaries and refuges for regional waterfowl (Page 3-51, EIS). American alligators, listed and protected as an endangered species by the U.S. Fish and Wildlife Service, use the Steel Creek delta and swamps as feeding and breeding grounds (page 3-50, EIS). American alligators are sensitive to increases in ambient temperature, and irrespective of wetlands losses the elevation of the local water temperatures above the alligator's tolerance limits, as proposed, may have illegal consequences.	wetland impacts associated with the implementation of a cooling-water mitigation alternative. Critical habitat, as defined and protected by the U.S. Fish and Wildlife Service, does not exist on the SRP, including the Steel Creek ecosystem. Chapter 7 of this EIS has been revised to reflect the current status of consultations with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. Also see the response to comment AA-1 regarding the cooling-water alternatives in this Final EIS--including DOE's preferred alternative--and the responses to comments AD-3, AF-2, and AP-4, regarding the wood stork, American alligator, and cooperation with the Department of Interior in using the Habitat Evaluation Procedures (HEP).
DR-2	Heated water would have a drastic and detrimental effect on the anadromous American shad population that spawns in the Steel Creek/Savannah River region. Gravid fish would be completely isolated from their spawning grounds by an impenetrable thermal barrier (Appendix C, page 47, EIS). In many estuarine systems, such as the Chesapeake Bay, drastic reductions in American shad fisheries have been linked to the sensitivity of this anadromous species to disruption of its freshwater spawning grounds.	Section 4.1.1.4 of the EIS addresses the ecological impacts to anadromous fish, including the American shad for the direct discharge of cooling water. Isolation of spawning grounds above the mouth of Steel Creek could occur with direct discharge, but analysis of data supported by prior studies show that a zone of passage will be maintained in the Savannah River. Sections 4.4.2., 4.4.2.6, 4.5, and Appendix L of this Final EIS discuss DOE's preferred cooling-water alternative. This alternative would provide a balanced biological community in a 1000-acre lake and would not affect spawning of riverine and anadromous fishes below the delta of Steel Creek.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DR-3	Certainly, the details of proposed general ecological losses are far more extensive than I have mentioned here. The point of these few important examples cited is to emphasize the extensive ecological degradation that may occur, and to underline the obvious importance of preventing such potential losses. However, the primary objective of this letter is to present an important inadequacy of the Draft EIS with regard to an insufficient coupling of ecological destruction, environmental degradation, and hydrological changes with the effects of each of these on the entire Savannah River ecosystem. The first major misconception of the EIS is in regard to the arbitrary boundaries applied to the threatened ecosystem. These boundaries, and thus the extent of the EIS, include only Steel Creek and the Savannah River Swamp (where Steel Creek meets the Savannah River). In a lotic [flowing water] situation, such as this, particularly where impacts are being projected, it is crucial that the ecosystem in question be considered beyond the limit of any possible downstream impact. In the L-Reactor situation, this boundary must, by necessity, extend through the estuarine zone of the Savannah River and to the point in the coastal oceanic environment where the Savannah River has no significant effects on the local ecology and environment. This is because of the inherent dependence of flowing-water ecosystems on upstream sources of energy, the most important of which is suspended particulates--detritus. Detritus-based food webs are the most significant feature of aquatic ecosystems, particularly in estuarine subsystems. In a river dominated ecosystem such as the estuarine Savannah River, fluvial detrital inputs provided the bulk of the energy base for food webs. This riverine detritus is derived from either terrigenous runoff or from erosion of bottom sediments. It is this erosional source that is important here.	In addition to the detritus that is produced by the Steel Creek ecosystem, the estuarine zone of the Savannah River receives detrital inputs from aquatic and terrestrial habitats as far up river as Clarks Hill Reservoir, a distance of approximately 220 river miles. The Steel Creek ecosystem is emphasized in the EIS because it is the area of greatest potential impact. In addition to extensive ecological analyses in the immediate vicinity of the SRP, studies have also been performed in estuarine environments in the vicinity of Savannah, Georgia.
DR-4	According to the Draft EIS, page 3-61, about 284 curies of cesium-137 have been discharged into Steel Creek since 1955. Because cesium displays a characteristic tendency to flocculate with clay and silt particles, most of this radiocesium is associated with the clay/silt sediments of Steel Creek, the Steel Creek delta, and the Savannah River Swamp. In Steel Creek and the delta, 69% of the cesium is associated with the upper 20 cm of sediments, and 86% with the upper 40 cm (page 3-62, EIS). The swamp shows even more concentrated cesium levels, with 70%	Section 3.7.2.1 and Appendix D discuss the distribution of cesium-137 in Steel Creek-Creek Plantation Swamp soils, and the inventory of cesium-137 remaining in these areas. Information provided in Sections D.2 and D.4.5 shows that the concentration of cesium-137 is greatest in Steel Creek, not in Creek Plantation Swamp. An area in Steel Creek, about 580 acres, contains about 0.106 curie per acre. This is 4.7 times the 0.022 curie per acre found in Creek Plantation Swamp, which has an area of 940 acres.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DR-5	of all cesium associated with the top 6-7 cm of sediments. It should be noted that the swamp discharges directly into the Savannah River proper. The Steel Creek delta is a typical fluvial deltaic fan with organic and alluvial deposits overlying a sand layer and stabilized by vegetation. The surface depositional layer is 65% clays and silts (Table 3-18, EIS). In wetland environments, submerged aquatic vegetation and emergent vegetation stimulate the settling of fine colloidal particles (clays and silts) by reducing local water velocities and effectively holding these fine sediments in place. This vegetation is critical to maintenance of the substrate during storm events as well, when it serves to dampen the erosional energy of increased discharge. In environments (such as Steel Creek, the delta, and the swamp) where the surface sediments are contaminated, it is even more critical that this vegetative buffer be maintained. The initial effect of cooling effluents released at 70°C (160°F) into Steel Creek, as proposed, would be to kill off this crucial vegetation. This is documented in the Draft EIS. In addition to the thermal stresses noted above, drastic increases in flow rates and stream discharge due to the L-Reactor operation will contribute to the destruction of essential vegetative buffers in the Steel Creek ecosystem. The expected average base flow discharge of Steel Creek at Road A, midway between the L-Reactor and the Savannah River Swamp, is 1 m³/s, with maximum storm even discharges of 4-8 m³/s (page 3-22, EIS). The 15 years this system has had to "recover" since the L-Reactor shutdown is a short time, ecologically. No aquatic ecosystem (as I have defined here) can reach the species diversity and niche separation essential for stability in this period of time, and an unstable, developing ecosystem such as that found in Steel Creek is more vulnerable to environmental perturbations. More importantly, the Steel Creek-Savannah River Swamp subsystem has "evolved" under a standard flow regime of 1 m³/s, with storm maxima of 4-8 m³/s. The proposed effluent discharge from the L-Reactor into this system is 11 m³/s, far above naturally occurring rates. Even if thermal stress was eliminated, this drastic and immediate increase in base flow could not be tolerated by the submerged and emergent plant communities.	The importance of vegetation in soil stabilization and reducing flow rates is well known; it accounts, in part, for the facts that cesium-137 distributions in Creek Plantation Swamp have not changed areally and that the cesium-137 is confined to the upper centimeters of swamp soils. Historic data, however, show that the vegetation of Creek Plantation Swamp will not be affected appreciably if direct discharges of L-Reactor cooling water to Steel Creek are resumed. In contrast, the vegetation in the Steel Creek-delta area will be adversely impacted and much of this vegetation containing cesium-137 will be transported to the Savannah River. The estimate of cesium-137 transport from Steel Creek includes 0.4 curie as contaminated vegetation during the first year. The relationship between species diversity and ecological stability is not clearly understood, nor is the scientific community in agreement that stability can ever be measured. As contended, however, if thermal stress was eliminated, flow rates will destroy nearly all of the submerged and emergent plant communities of the Steel Creek corridor and portions of its delta. Impacts to vegetation from the discharge of cooling-water are discussed in Section 4.4.2.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DR-6	The result of combined thermal and flow stresses, at proposed levels, would be to eliminate the vegetation crucial to maintenance of the contaminated Steel Creek, deltaic, and swamp sediments. Coupled with a 12-fold increase in the base flow discharge, elementary hydrology predicts rapid erosion of these fine sediments and virtually complete entrainment in the water column. The radiocesium would then be taken up quickly by bacteria associated with the detrital particles, and by benthic and nektonic detritivores and omnivores. Thus, as this plume of radiocesium-contaminated suspended sediments flows with the Savannah River, it is being incorporated into the important detrital food web, and the result is an apparent "dilution" of cesium in the water column (reported in the EIS). Within the food web, however, a classical case of biomagnification will concentrate radiocesium levels at an exponential rate across trophic levels, from bacteria and zooplankton to upper carnivores and omnivores (both benthic and nektonic). Many of these upper trophic level species living in the Savannah River and the Savannah River estuary support important local fisheries, and as a result man may be the eventual consumer and concentrator of the radiocesium presently trapped in Steel Creek sediments. The key concept here is the dynamic quality of lotic ecosystems. The effects of cesium on downstream populations are functions not of the cesium levels detected downstream, as is implied by the Draft EIS, but rather of the trophic level interactions occurring throughout the ecosystem. Until this critical aspect of the radiocesium question has been examined, the Environmental Impact Statement is not complete.	As noted in Section D.2.3.1, less than 20 percent of the cesium-137 currently being transported from Steel Creek is associated with the suspended sediment (detrital) fraction. About 80 percent is transported in the dissolved-colloidal fraction. This situation is not expected to be altered appreciably after the loss of vegetation in the Steel Creek corridor-delta area. Bioaccumulation is discussed in Appendixes B and D and is also taken into account in the dose calculations presented in Section B.3. The dose calculations are conservative because they did not consider the decrease in cesium-137 concentration with distance downstream from the mouth of Steel Creek. A decrease of 52 percent has been measured between the Highway 301 and Highway 17 bridges over the Savannah River.
DR-7	The National Environmental Policy Act of 1969 initiated the Environmental Impact Statement process to protect our natural environment from unnecessary and irresponsible damage. While I do not want to open the "Pandora's Box" issue of the real, or apparent, need for operation of the L-Reactor, I will point out that it is now accepted by all parties involved that a delay in the scheduled restart of the L-Reactor will have no significant impact on the defense industry, or on national security. There is no reason for restarting the reactor until all environmental and safety questions have been answered.	See the responses to comments BL-15 and BL-19 regarding the need for defense nuclear materials.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DR-8	It is in the best interest of the public and the Steel Creek/Savannah River ecosystem that the Savannah River Plant L-Reactor remain dormant. I stand firmly behind this decision as the only viable alternative. I do realize, however, that this solution is probably not favored by the Department of Energy "decision makers." To that end, I pose the following limitations to L-Reactor operation, and I will actively protest any attempts to operate this unit without at least these rudimentary protective measures: 1. Effluent temperatures into Steel Creek must never exceed 30°C, and appropriate cooling apparatus must be installed to insure this upper limit. Furthermore, to minimize effects of the outfall on ambient seasonal trends in temperature locally, the effluent temperature must not exceed 20°C in the winter. 2. Effluent discharges of 11 m³/s are unacceptable. The reactor restart must be gradual, and outflow controls must be installed in order to achieve the following outfall flow regime: - Initially, discharge flow must not exceed 2 m³/s - over a period of 2-3 years, discharge is gradually increased at a rate not to exceed 2 m³/s per year - effluent discharge must <u>never</u> exceed 8 m³/s - during storm events, discharge is reduced so total flow through the Steel Creek ecosystem never exceeds 8-10 m³/s In monitoring both of these parameters (temperature and discharge), it is important that only instantaneous maxima be considered and not time averaged values. In order to protect critical submerged aquatic and emergent vegetation, and thus prevent erosion of contaminated sediments resulting in cesium poisoning of the entire Savannah River ecosystem, these recommendations must be viewed as minimal, and expanded upon. Neither technology, nor money, nor time is a limiting factor, and the SRP L-Reactor must operate within the confines of federal law.	See the response to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives in this final EIS. Section 4.4.2 of this EIS, discusses impacts due to both temperature and flow rate of the cooling-water mitigation alternatives. Also see the response to comment AA-2 regarding resuspension of radlocesium and its relationship to EPA drinking-water standards.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Please send me a copy of the finalized Environmental Impact Statement for the SRP L-Reactor restart proposal, and keep me fully informed about the full decision-making process. If you have any questions regarding my observations, comments, or recommendations, please feel free to contact me. Thank you for your time, Sincerely yours, Daniel L. Childers 803 777 3945	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF ALEXANDER SPRUNT, IV		
National Audubon Society Research Department 115 Indian Mound Trail Tavernier, Fla. 33070 (305) 852-5092		
9 November, 1983		
Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment Department of Energy Savannah River Operations Office P. O. Box A Aiken, SC 29801		
Dear Mr. Sires:		
This letter is in response to the Draft EIS for L-Reactor Operations, Savannah River Plant. We are concerned with the effect of loss of foraging habitat for Wood Storks on the future of the species.		
DS-1	Our research has shown that the Wood Stork population has declined from about 10,000 pairs in 1960 to about 4300 pairs in 1983. Loss of foraging areas that could cause a drop in productivity or, at worst, complete failure or abandonment of a colony site could have serious effect on overall stork populations. Data given in the Draft EIS indicate that more Wood Storks foraged in 1983 on the Savannah River Plant (SRP) than on surrounding areas. This, however, is incomplete information. The first sighting given is for 23 June, about two months after nesting began at the Birdsville colony. Information needs to be gathered for the <u>entire</u> nesting period and the percentage of	The final EIS in Appendix C, Section C.3.2, contains more detailed information on the wood stork than was available for the preparation of the Draft EIS. In addition, Chapter 7 of this final EIS presents the current status of consultations with the U.S. Fish and Wildlife Service on the woodstork. Responses to comments contained in comment letter "AD" also provide additional information on the woodstork.

M-333

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
DS-2	storks foraging at the SRP compared with that for the surrounding area in order to determine the importance of the SRP lands as foraging sites. To proceed with restarting L-Reactor on the basis of the partial information given would be a blatant disregard for the future of a proposed endangered species. We see no mention of plans to provide alternate foraging habitat before the current SRP sites are destroyed by the proposed start-up of L-Reactor. Further, we see no serious consideration of <u>any</u> of the 12 alternatives to direct discharge into Steel Creek previous to initial start-up. In view of the possible damage to Wood Stork populations and our concern for the future of this species, we object to the start-up of L-Reactor until adequate research and mitigation can be agreed upon.	The mitigation of thermal impacts to endangered species could be attained by the implementation of alternative cooling systems, which are described in Section 4.4.2 and Appendix I of the EIS. Also, see the response to comment AA-1 regarding cooling-water mitigation alternatives.
	Very truly yours, Alexander Sprunt, IV Research Director	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF LINDA MORGAN		
Linda Morgan 1011 Woodland Drive West Columbia, South Carolina 29169 November 11, 1983 Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801 Dear Mr. Sires, DT-1 Protecting our environment has future implications for the welfare of our citizens. State and Federal regulations for commercial nuclear reactors were carefully formulated to allow for protection of our environment, as well as to allow for production of energy. At the present time, weapons materials are being produced at the Savannah River site without regard to the state and Federal regulations. Reactors at SRP can comply with regulations and still produce materials that the government feels is necessary. An overriding concern for me is the damage inflicted on the environment. I would like to see the operations at SRP comply with state and Federal regulations as soon as possible and that steps be taken to ensure that the L-Reactor comply with the regulations before startup. Sincerely, Linda Morgan		
		See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable federal and state regulations and to take all reasonable steps to mitigate impacts, and the response to comment BF-7 regarding differences between SRP reactors and commercial light-water reactors.

M-335

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF ROBERT WINTHROP II		
Groton Land Company, Inc. Route 1, Box 98 Luray, South Carolina 29932 (803) 625-4160 November 11, 1983 Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, SC 29801 Dear Mr. Sires, DU-1 I would like to register my concern about safety at the Savannah River Plant, specifically the startup of the L-Reactor. I urge you to do everything in your power to make sure that the L-Reactor is not made operational before it is ascertained to be completely safe. Yours sincerely, Robert Winthrop II RW:JJ		
		See the response to comment CF-3 regarding startup of the L-Reactor, and the responses to comments AA-3 and AF-2 regarding COE commitments to comply with applicable Federal and state environmental protection requirements and to take all reasonable steps to mitigate prior to restart.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	STATEMENT OF LIZ PAUL	
	GROUNDWATER ALLIANCE Box 4090 Ketchum, Idaho 83340	
	Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801	
	Subject: Comments on DEIS for L-Reactor	
	Mr. Sires,	
M-337 DV-1	Regardless of the local environmental impact of resumption of operations of the L-Reactor, which stand alone as reason enough to never operate the reactor again, operation of the L-Reactor will bring the world closer to a nuclear exchange which would have catastrophic effects on the global environment. The production of nuclear materials in the L-Reactor will allow the U.S. to increase its nuclear arsenal creating greater global tension which may spark a nuclear exchange. The simple presence of an increased nuclear arsenal also increases the possibility of error, human or technical, which may cause a nuclear exchange. Explosion of only a small portion of the nuclear warheads existing today will damage the global environment so severely that the continued existence of life will be in question. "Enormous amounts of light-absorbing and light reflecting particulate debris will cloak the atmosphere in a dark veil which will hinder sunlight for months. In the Northern Hemisphere vast fires will almost certainly sweep over expanses of forest land and agricultural fields, and these fires along with those in oil and gas fields ignited by the thousands of nuclear explosions will load the lower atmosphere with tiny particles of tar, soot and ash. When the fires burn out and the particles eventually fall to	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	the ground, the changed chemistry of the atmosphere would be such that a severe photochemical smog could form over much of the Northern Hemisphere...A large reduction of the stratospheric ozone layer is also possible...In addition to wartime destruction and poisoning, the natural environment might suffer such grave long-term changes as to severely threaten the survivor's fight for recovery."* The L-Reactor must be decommissioned not restarted. Operation of C, K and P reactors at SRP and the N reactor at Hanford must stop also. Sincerely, Liz Paul, Groundwater Alliance	

*Ambio, Royal Swedish Academy of Sciences, Volume XI, Number 2-3, 1982.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF M. R. JOHNSON		
	Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office P. O. Box A Aiken, SC 29801	
	Dear Sir;	
DW-1	I am sending this letter to let you know of my concern over the restart of the L-Reactor at the Savannah River Plant. This reactor is obsolete and if reactivated will not conform to NRC standards and will further strain relations between the citizens of South Carolina and the Savannah River Plant. Please let me know of any further opportunity for public comment and concern. Sincerely, M. R. Johnson 16 Meadow St. Lyman, SC 29365	See the responses to comments AF-1, BF-7, and BF-8 regarding the differences between SRP reactors and commercial light-water reactors.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF SALLY BATTLE		
Mr. Melvin J. Sires III U.S. Dept of Energy Savannah River Operations Office PO Box A Aiken SC 29801		
This is a confirmation copy of a telegram addressed to you:		
DX-1	Protect our environment: before any L RX startup assure DOE facilities compliance with state and Federal standards applicable to commercial reactor sites.	See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable federal and state regulations and to take all reasonable steps to <u>mitigate impacts</u>, and the responses to comments AF-1, BF-7, and BF-8 regarding the differences between SRP reactors and commercial light-water reactors.
Respectfully,		
Sally Battle 418 Maple Columbia, SC 29205		
21:41 EST		
MGMCOMP		

M-340

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF JOHN E. ALCOCK		
	United States Department of Agriculture Forest Service Southern Regional Office 1720 Peachtree Rd., NW Atlanta, GA 30367 Reply to 1950 Date October 31, 1983 Mr. Richard P. Denise Acting Manager Department of Energy Savannah River Operations Office P.O. Box A Aiken, South Carolina 29801 Dear Mr. Denise: The USDA Forest Service has reviewed the DEIS, titled, "L-Reactor Operation, Savannah River Plant, Aiken, South Carolina." Our personnel at the SRP and in the Regional Office in Atlanta were involved in the review.	
DY-1	We have no major comments on the DEIS. One editorial change should be made in the FEIS. In Appendix C, page C-71, second paragraph, last sentence, the amount of seedlings planted in 1980 should be changed to <u>1,530,000</u> seedlings of loblolly pine and <u>160,000</u> seedlings of longleaf pine. We appreciate the opportunity to review this DEIS on the "L-Reactor Operation." John E. Alcock Regional Forester cc: SRFS WO (EC)	The change has been made as noted.

M-341

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF LARRY L. CALDWELL		
	November 10, 1983 1449 Thayer Drive Richland, WA 99352 Phone: (509)-946-9039	
	Mr. M. J. Sires, III, Assistant Manager Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office Aiken, South Carolina 29801	
	Mr. Sires:	
	Attached are my comments on the Draft Environmental Impact Statement: <u>L-Reactor Operation Savannah River Plant Aiken, S.C. (USDOE [DOE/EIS-01080], September 1983, 2 Volumes)</u> pursuant to <u>Federal Register</u> notices and appropriate Federal statutes.	
	Sincerely yours,	
	Larry L. Caldwell	
	LLC/lb	
	Distribution: (4) to Savannah River (2) to file	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	<u>COMMENTS ON</u>	
	<u>DRAFT</u>	
	<u>ENVIRONMENTAL IMPACT STATEMENT</u>	
	<u>L-REACTOR OPERATION</u>	
	<u>SAVANNAH RIVER PLANT</u>	
	<u>AIKEN, S. C.</u>	

Larry L. Caldwell
1449 Thayer Drive
Richland, WA 99352
November 10, 1983

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	After having perused the <u>Draft Environmental Impact Statement: L-Reactor Operation Savannah River Plant Aiken, S.C. (USDOE [DOE/EIS-0108D], September 1983, 2 Volumes)</u>, I am, indeed, incensed and, at the same time, sick-at-heart. That so-called "rational and intelligent" people could produce such a document is apt comment on the psychosis that has brought us Savannah River, Oak Ridge, Hanford, etc., etc., etc., and pointedly illustrates that George Orwell's <u>1984</u> has already arrived.	
DZ-1	With over 16,000 million equivalent TNT tons of nuclear weaponry crammed into every cranny of the globe--enough nuclear weaponry, by the way, for over three (3) tons/person on the earth--to rationalize, as this DEIS does, that more weapons-grade plutonium-239 and tritium is necessary to insure "national security" is the height of Orwellian "newspeak" and indicative of a "world-turned-upside-down" mentality. To openly advocate such nonsense borders on the insane. For <u>any</u> Administration to propose such a policy through something called a "Nuclear Weapons Stockpile Memorandum" is sad. And, for the Savannah River Operations Office to <u>blindly</u> follow this lead--ala the brown-shirts of Nazi Germany--is sickening. If we learned anything from the Nuremberg experience, it was that ultimately each of us are responsible for our own actions before the bar of international justice. We cannot cite higher authority to excuse crimes against our fellow humans. The people who compiled this DEIS should carefully consider that fact in preparation of the final EIS. As for myself, I am opposed to the "restart" of Savannah River's L-Reactor under any circumstances that the Administration/Department of Energy/Savannah River Operations Office can concoct. It is not necessary; we do not "need" it; it will be destructive to our frail environment, a wasteful expenditure on an already strained treasure, a squandering of our natural resource, and a dangerous threat to humankind. I will not, therefore, dignify the warped reasoning and the deplorable science contained in this DEIS with any further comment.	These comments are outside the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF GEOFFREY I. SCOTT, PH.D., and CHARLES E. FEIGLEY, PH.D. University of South Carolina Columbia, S.C. 29208 School of Public Health Department of Environmental Health Sciences Benson School, Room 306 (803) 777-6994 November 11, 1983 Mr. M. J. Sires Asst. Manager Health, Safety and Environment U.S. DOE Savannah River Operations Office P.O. Box A Aiken, SC 29801 Dear Sir: This letter is written in response to review of the Draft EIS prepared by the U.S. Department of Energy in regards to environmental impacts resulting from the start-up of the L-Reactor. Close inspection of this document by members of the faculty in the Department of Environmental Health Sciences at the University of South Carolina, has revealed several deficiencies or shortcomings in the proposed restart of the L-Reactor including:		
EA-1	(1) Deficiencies and inadequate consideration of the increased quantities of hazardous waste generated from restart.	See the responses to comments DA-2 through DA-7 regarding hazardous waste.
EA-2	(2) Inadequate consideration of these additional quantities of waste, in regards to present groundwater contamination stemming from inadequate storage and treatment of present levels of hazardous wastes.	See the responses to comments AJ-1, DA-2, DA-5, DA-6, and DA-8 regarding ground-water contamination.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EA-3	(3) Inadequate consideration of potential human health effects from present hazardous waste groundwater contamination at the plant.	See the responses to comments AJ-1, DA-2, and DA-4 through DA- regarding ground-water contamination and its effects.
EA-4	(4) Lack of appropriate epidemiological risk assessment of multiple exposure risks from plant operation. (There has been no consideration of additive and/or synergistic effects of halogenated groundwater contamination problems and slightly elevated radiation levels in surface waters which would result from L-Reactor restart.)	Contaminated ground-water wells have been shut down so that onsite personnel cannot drink water with elevated levels of chlorinated hydrocarbons. In addition, the health of onsite personnel will be protected by changes in the water distribution system, which now obtains potable water only from the A-Area Tuscaloosa wells that are unlikely to be contaminated from ground water from the Tertiary aquifers. Information on ongoing and health effects/epidemiological studies is provided in Section 6.1.5. In regard to synergistic effects, the 1982 Report of the U.N. Scientific Committee on Effects of Atomic Radiation, "Ionizing Radiation: Sources and Biological Effects," states (p. 762): "For humans in environmental circumstances the Committee has been unable to document any clear case of synergistic interaction between radiation and other agents, which could lead to substantial modifications of the risk estimates for significant sections of the population.... A specific exception is the case of tobacco smoke, which raises essentially problems of industrial hygiene in some working environments."
EA-5	(5) Improper consideration of cooling towers as a viable option for mitigating thermal impacts. and (6) Deficiencies and mistakes in elimination of a cooling tower for mitigating thermal impacts to wetlands in the Steel Creek Corridor. In addition, site inspection of the L-Reactor has revealed significant improvements in worker safety at the L-Reactor, such as improvements in the containment area/basin and removal of an asbestos hazard at the site. These represent genuine and sincere attempts by U.S. DOE to improve the occupational safety of	See the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	the plant and to reduce radiological impacts. Construction of a cooling tower to prevent external environmental impacts in the Steel Creek Corridor would seem consistent with DOE's present plant renovations. Additional considerations should be given to allow start up and direct discharge of heated effluent in the Steel Creek Corridor until a cooling tower can be built. This option seems completely inconsistent, whimsical, and capricious since the magnitude of thermal impact (amount of wetlands impacted) would be the same, only the time period for recovery would be changed.	
EA-6	Current NEPA regulations insist that significant impacts should be avoided. The destruction of 1000 acres of wetlands certainly is a significant impact. NEPA regulations make no mention of whether impacts should be reversible or irreversible nor has any mention of a time-frame for recovery been included in this legislation. Without specific guidelines for these questions, it would seem that the potential for impact whether reversible or irreversible should be seen equally under the law. Thus construction of a cooling tower should be mandated and restart should be postponed until completion of the cooling tower. This scheme would prevent the leaching of radioactive isotopes from sediments and would also prevent destruction of wetlands in the Steel Creek Corridor. The environmental benefits from this consideration (reduced thermal and radiological impacts) should far outweigh the economic justification implied by DOE as a reason for not constructing cooling towers. Sincerely, Geoffrey I. Scott, Ph.D. Charles E. Feigley, Ph.D.	See the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives in this EIS, and the response to comment BM-1 regarding the Record of Decision on this EIS.
/alw		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF SUE CRAMER		
November 10, 1983		
Dear Mr. Sires,		
EB-1	I am opposed to the Department of Energy's proposed plan to start up an old production reactor at the Savannah River Plant.	See the response to comment CF-3 regarding the L-Reactor startup.
EB-2	As a voting citizen of the United States of America I am encouraging you to require that the Department of Energy comply with federal and state environmental standards applicable to commercial reactor sites.	See the response to comment AA-3 regarding DOE's commitment to comply with all applicable Federal and state regulations, and the response to comment BF-7 regarding the differences between SRP reactors and commercial light-water reactors.
The rights of all Americans are at stake and the impacts of this foolish and impulsive plan are avoidable. The outcome will be permanent.		
Thank you,		
Sue Cramer 406 N. Main St. Lancaster, SC 29720		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MICHAEL GARDNER		
Mr. Melvin J. Sires, III		
Dear Sir:		
EC-1	Please consider sacrificing natural environmental areas permanently to utilize, temporarily, a L-Reactor plant that will increase our ability to destroy ourselves and our world, which has been entrusted to us. So please consider carefully the impact that will occur if Department of Energy facilities are not required to comply with Federal and state environmental standards.	See the response to comment AA-3 regarding DOE's commitment to comply with all applicable Federal and state regulations.
Sincerely		
Michael Gardner 2026 Middleton Pl. Rock Hill, SC 29730		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF WILLIAM P. DAVIS		
	517 N. Wilson St., Apt 3 Rock Hill, S.C. 29730 November 10, 1983	
	Mr. Melvin J. Sires, III U.S. Dept. of Energy Savannah River Operations Office P.O. Box A Aiken, S.C. 29801	
	Dear Mr. Sires:	
	Please accept this letter as an expression of my grave concern over the start-up of the L-Reactor at the Savannah River Plant.	
M-350 ED-1	Since renewed operation is deemed essential to the national security and this project is bound to continue, I urge the Department of Energy to carefully consider the impact upon the environment.	See the response to comment AT-3 regarding preparation of this EIS.
ED-2	I am particularly concerned about the discharge of cesium into the Savannah River, not to mention the discharge of hot water in large quantities into the river.	See the responses to comments AA-1 and AA-2 regarding issuance of an NPDES permit for thermal discharge and the relationship of radiocesium and radiocobalt concentrations to EPA drinking water standards.
ED-3	I strongly feel that the plant should be made to comply with all state and federal environmental standards and urge the Department to ensure such compliance.	See the responses to comments AA-3 and BF-7 regarding DOE's commitment to comply with applicable Federal and state regulations and the differences between SRP reactors and commercial light-water reactors.
	Yours very truly,	
	William P. Davis	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF CAROLYN N. TUTWILER		
	1217 Hermitage Rd. Rock Hill, SC 29730 Nov. 10, 1983	
	Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801	
	Dear Sir:	
EE-1	I am very concerned about the proposed resumption of operations of the L-Reactor at the Savannah River Plant. I urge that the Department of Energy be required to comply with federal and state environmental standards applicable to commercial sites.	See the responses to comments AA-3 and BF-7 regarding DOE's commitment to comply with applicable Federal and state regulations and the differences between SRP reactors and commercial light-water reactors.
EE-2	Measures need to be taken to protect the environment <u>before</u> the reactor is started up.	See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state regulations and to take all reasonable steps to mitigate impacts.
	Sincerely yours,	
	Carolyn N. Tutwiler	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

STATEMENT OF HARRY M. DALTON

November 11, 1983

Mr. Melvin J. Sires III
United States Dept. of Energy
Savannah River Operation Office
P.O. Box A
Aiken, South Carolina 29801

Dear Mr Sires,

EF-1 I am writing to express my concern about the premature start up of the L-Reactor at the Savannah River Plant. It would appear that we are proceeding with unnecessary haste in the matter. There is sufficient data already on record which brings into question the DOE claim and suggests that the delay of start up would in no way jeopardize National security.

See the response to comment BL-15 regarding the need and timing of defense nuclear materials.

EF-2 It is my thought and opinion that the DOE facilities be required to comply with federal and state environmental standards applicable to commercial reactor sites. It is important that you consider all precautions to avoid damage to the environment before the start up is allowed.

See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state regulations and to take all reasonable steps to mitigate impacts, and the response to comment BF-7 regarding the differences between SRP reactors and commercial light-water reactors.

Very truly yours,

Harry M. Dalton
663 Glendale Dr.
Rock Hill, SC 29730

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF GEORGE C. BATTLE		
Mr. Melvin J Sires III US Dept of Energy Savannah River Operations Office PO Box A Aiken, SC 29801 This is a confirmation copy of a telegram addressed to you: EG-1 Protect our environment: before any L-Reactor start up assure DOE facilities compliance with state and Federal standards applicable to commercial reactor sites. Respectfully Sally Battle 418 Maple Columbia 22:01 EST MGMCOMP		
		See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state regulations and to take all reasonable steps to mitigate impacts, and the response to comment BF-7 regarding the differences between SRP reactors and commercial light-water reactors.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF JOYCE P. DUBUC		
1574-E Ester Ct. Rock Hill, SC 29730 Nov. 10, 1983		
Mr. Melvin J. Sires III U.S. Department of Energy Savannah River Operations Office Post Office A Aiken, South Carolina, 29801		
Dear Sir:		
EH-1	I trust the Department of Energy will seriously consider, prior to starting up the Savannah River operation, any damage that may be inflicted on our already damaged environment. Please be aware that many people are deeply concerned about the effect of your operation.	See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state regulations and to take all reasonable steps to mitigate impacts, and the response to comment BM-1 regarding DOE's Record of Decision on this EIS.
Sincerely,		
Joyce P. Dubuc (Mrs. Guy J. Dubuc)		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

STATEMENT OF CHARLES T. HESS

C.T. HESS, PH.D.
NUCLEAR PHYSICIST

RADIATION MEASUREMENT
AND CONSULTATION 103 SPRING STREET
STILLWATER, MAINE 04489
PHONE 207-827-5991

November 12, 1983

Mr. M. J. Sires
Assistant Manager for Health Safety and Environment
Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29801

Dear Mr. Sires:

Enclosed please find my comments about the Environmental Impact Statement - L-Reactor Operation Savannah River Plant (L-Reactor EIS). I hope it is in a form suitable for your consideration.

Sincerely yours,

Charles T. Hess
Professor of Physics

CTH/rjl

Enc.

M-355

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Comments of Charles T. Hess, Ph.D. Professor of Physics University of Maine, Orono, Maine	
	REGARDING: The Draft Environmental Impact Statement L-Reactor Operation Savannah River Plant DOE/EIS-01080 Volume 1.	
	I am pleased to supply comments about the Environmental Impact Statement. I am mainly qualified to discuss the portions of the EIS which are concerned with the liquid releases from the L-Reactor. My experience has been in several environmental radioactivity studies in the vicinity of the Maine Yankee Atomic Power Plant, especially as it relates to radionuclide uptake in shellfish and distribution of nuclides in estuary sediments. I also study radioactivity in water supplies and have served as the chairman of the Occurrence Committee for the National Workshop on Radioactivity in Drinking Water, sponsored by the United States Environmental Protection Agency.	
	The importance of the liquid pathway radionuclides can be understood best by looking at the sources in table 4.11 EIS "Expected average annual liquid radioactive releases from L-Reactor operation (curies per year)". In this table is a list of radionuclides which are expected to be released to Steel Creek, to the seepage basin, or which will get into Steel Creek with movement of groundwater. These sources are totaled after 1 year or 10 years of operation. Radionuclides released into Steel Creek are just ^3H, ^{58}Co, ^{60}Co, ^{90}Sr, ^{137}Cs and unidentified beta-gamma and unidentified alpha emitters. In the seepage basin the releases are ^3H, ^{32}P, ^{35}S, ^{51}Cr, ^{58}Co, ^{60}Co, ^{89}Sr, ^{90}Sr, ^{91}Y, ^{106}Ru, ^{125}Sb, ^{134}Cs, ^{137}Cs, ^{144}Ce, ^{147}Pm and unidentified beta-gamma and unidentified alpha. The largest amount released per year and totaled to Steel Creek, is ^3H with 3.6×10^2 curies/year. Others are ^{58}Co with ^{60}Co 4.5×10^{-2} curies/year, ^{90}Sr 1.6×10^{-4} curies/year, ^{137}Cs 4.1×10^{-1} curies/year. Unidentified beta-gamma 1.1×10^{-1} curies/year is assumed to be ^{90}Sr. Unidentified alpha 1.0×10^{-5} curies/year is assumed to be ^{239}Pu.	
	Some of these liquid sources such as ^{137}Cs, and ^{58}Co, ^{60}Co will be absorbed by sediments in the Steel Creek and Savannah River and will produce gamma exposures which be in excess of 25	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EI-1	mrem/year. Most of the swamplands up to 7 miles down stream from the plant range from 42 - 670 mrem/year for constant exposure according to exposure contours reported in 1974 from an Aerora-diographic Survey by Marter "Radioactivity from SRP Operations in a Downstream Savannah River Swamp." The upper limit of these levels 670 mrem/year even exceeds the D.O.E. restrictions on accessible areas near defense plants, a fact which is not stated in the EIS. These levels exceed the 25 mrem/year limit for radiation exposure to the public for outside the fence of a commercial nuclear power reactor, which is regulated by the U.S.E.P.A. Fortunately, these areas are not populated 100% by the people using them. The low time fraction reduces the accumulated dose from these operations to a small fraction of the natural background of 100 - 150 mrem/year. Access to this area by fishermen, and hunters should reflect this dose which is likely to be similar to the surveys in 1970's.	Both the DOE and EPA dose limits cited recognize occupancy as a significant element in determining compliance. As noted, occupancy of these areas is sufficiently low to assure that actual doses to individuals are well within the applicable limits.
EI-2	A second pathway of exposure is in the ingestion of nuclides which are released either in drinking water or by consumption of fish and shellfish which live in the discharge waters or in the Savannah River and its estuary. When we look at the U.S.E.P.A. Interim drinking water standard for radionuclides, the regulated concentration produces a dose of 4 mrem/year to a population drinking 2 liters per day. The allowed maximum concentrations are 20,000 pCi/l for ^3H, 500 pCi/l for ^{35}S, 300 pCi/l for ^{58}Co, 100 pCi/l for ^{60}Co, 8 pCi/l for ^{90}Sr, 300 pCi/l for ^{125}Sb, 80 pCi/l for ^{134}Cs, 200 pCi/l for ^{137}Cs, 100 pCi/l for ^{141}Ce (not same isotope), 100 pCi/l for ^{149}Pm (not same isotope). The unidentified beta-gamma should use a worst case ^{129}I (1 pCi/l) instead of assuming 8 pCi/l for ^{89}Sr. For unidentified alphas 3 pCi/l will be allowed for radium, while the assumed nuclide ^{239}Pu has no specific standard. In addition to these releases, there are the old radionuclides which were buried in the sediments of Steel Creek and downstream portions of the Savannah River and its flood plain. These radionuclides were deposited by past use of the L-Reactor and other reactors operating since 1955. The major nuclides reported are ^{137}Cs, ^{90}Sr, ^{60}Co which are described in a later section of the EIS. There will be resuspension of these past radionuclides if L-Reactor is started. The major exposure to the population as	The EPA Interim Drinking Water Concentration Limits (40 CFR 141.15 and 141.16) apply to the finished water delivered by "a community water system," not to the raw water in the river. As presented in Table 5-12 of the Draft EIS, the dose calculated for the maximum adult individual due to liquid releases in the maximum year for L-Reactor and its support facilities (predominantly from Cs-137 resuspension) is 3.5 mrem per year based on fish and water intake directly from the Savannah River. The nearest downstream "community water systems" at Port Wentworth and Beaufort-Jasper have calculated doses of more than two orders of magnitude less than (i.e., 1/100) the EPA limits. The choice of surrogate for unidentified beta-gamma contributors is normally taken to be Sr-90 (not Sr-89) in water; changing to I-129 would produce no significant difference in the dose estimates.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
E1-3	expressed in 4.1.24 of the EIS due to nuclides in drinking water is to the populations of Beaufort-Jasper, and Port Wentworth which have water treatment plants that draw water from the Savannah River downstream from Steel Creek. The concentration at this point is estimated to be of the order of .01 pCi/l (of ^{137}Cs) which is much less than the drinking water standard. The estimates are based on the resuspension of sediments during the resumption of the L-Reactor operations. The only places where the ^{137}Cs and ^{60}Co are easily measurable is in the area one mile below Steel Creek and at the Highway 301 bridge and Highway 17 bridge where the radioactivity in the first year will be almost 0.5 pCi/l in the first location and 0.25 pCi/l in the second location.	However, although tritium concentrations are not reported at the above locations it is pointed out in a later section 4.1.2.27, page 4-29 that the Beaufort-Jasper and Port Wentworth population using the Savannah River for potable water, located 100 river miles downstream, and having an exposed population of 370,000 people, are exposed to (.0062 - 0.11 mrem/year) in the first and thirteenth year of operation. The estimated dose is 65% caused by tritium in the first year and 95% caused by tritium in the thirteenth year. Tritium is discussed as the major release nuclide as well. Reductions in population dose can be concentrated on reduction of these tritium releases to the water in Steel Creek.
	The maximum tritium concentration allowed in drinking water is 20,000 pCi/l. The liquid releases shown in DPST-81-241 page D-22 by H.E. Mackey, Jr. Table D-8 "Liquid Releases Dose Summary SKP-1980 Releases" show 27,000 Ci HTO, 0.002 Ci ^{60}Co, 0.4 Ci ^{90}Sr, 0.02 Ci ^{129}I, 0.19 Ci ^{137}Cs, 0.19 Ci ^{238}U and 0.006 Ci ^{239}Pu. This results in 0.214 mrem/year for fish consumption assuming 73.2% ^{137}Cs, 22.2% ^{90}Sr 4.89% HTO; and 0.438 mrem/year for drinking water, which is assuming, 86.7% HTO; 12.6% ^{90}Sr and 0.42% ^{137}Cs. This is 10% of the EPA safe drinking water limit. This means that a dilution of 10^{-13} is achieved by the released nuclide being mixed with Savannah River water. It also means that tritium may be the limiting nuclide for this plant. Doses of .4 mrem/year will correspond to about 2000 pCi/l of HTO in the water of the Savannah River. These amounts should be detailed in the EIS with the same care as is given for the discharged ^{137}Cs and ^{60}Co. Since these	See the response to comment E1-2 regarding applicability of EPA Drinking Water Concentration Limits and the small tritium contribution to near-site hypothetical individual or downstream community water supply users.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
E1-4	levels are near 10% of the safe drinking water limit in normal operations, plans are needed for small accidents of moderator spill into Steel Creek as suggested in 4.1.2.4. Tritium releases could lead to serious contamination of the drinking water in Beaufort-Jasper and Port Wentworth. These towns need an alternative water supply during an accident. The EIS must consider the liquid pathway consequences of small accidents which have a higher probability of occurrence. Plans for these eventualities should include emergency water supply plans for the Beaufort-Jasper and Port Wentworth. The EIS should include water supply measurements for assessment of the consequences of abnormal releases and for verification of dose calculations for both normal and abnormal operations.	Section 4.2.1.4 projects a potential for release of <u>airborne</u> tritium from a moderator spill which has no effect on the Savannah River or its users and, hence, no basis for need of "an alternative water supply" or emergency water supply plans. As discussed in Sections 2.2.3 and G.3.1.5.3 of the EIS, leakage between the primary and secondary cooling loops is continuously monitored and limited to a value that would result in a radiological release that is only a small fraction of acceptable release limits. Should this limit be exceeded, operating procedures require that the reactor be shut down and the heat exchanger be isolated to prevent further leakage. The radiological impact of leakage is a small fraction of the impact of total reactor wastewater discharges to the process sewer, which are well below applicable limits.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF F. JOHN VERNBERG November 14, 1983 Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, SC 29801 Dear Mr. Sires: The following comments relate to the Draft Environmental Impact Statement, L-Reactor Operation, Savannah River Plant, Aiken, SC. This letter reflects my personal opinion and does not imply any official response by my employer. By way of introduction, I submit a brief statement of my professional background. In 1951 I received a Ph.D. from Purdue University - my training was in ecology. Since then I was employed by Duke University (Instructor to Professor from 1951-1969) and the University of South Carolina (Baruch Professor of Marine Ecology and Director of the Belle W. Baruch Institute for Marine Biology and Coastal Research from 1969 to the present). One of my professional interests is in the area of wetlands ecology. I have published over 120 papers and books on pollution, physiology, and ecology. Further, I have served as President of the Estuarine Research Federation, President of the American Society of Zoologists, and Chairman of the Physiological Ecology Section of the Ecological Society of America.		
EJ-1	Resumption of the L-Reactor operation will have obvious and immediate negative impact on wetlands and the aquatic biota, especially in Steel Creek. According to the Draft EIS at least 1000 acres could be impacted. Until relatively recent times, these habitats have been considered as useless and expendable based on the disappearance of hundreds of thousands of acres of wetlands because of various man-made developments. However, a tremendous literature, not cited in the Draft EIS, has	The operation of L-Reactor will eliminate between 750 and 1000 acres of wetlands for the direct discharge of cooling-water. The 1000-acre figure is a conservative estimate, and represents a maximum value. Cooling-water mitigation alternatives to direct discharge are discussed in Section 4.4.2 and Appendix I. These sections include an analysis of wetland impacts if the mitigation alternatives were implemented prior to or after the L-Reactor restart. Also see the response to comment AA-1 regarding cooling-water alternatives.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	demonstrated conclusively their economic, environmental, and societal values. It does not seem justified to again subject this region of South Carolina to environmental destruction as was done earlier when the L-Reactor was operational and before federal legislation began to protect the environment.	
EJ-2	The draft EIS appears to adequately describe the extensive damage to wetlands, aquatic life, morphology of Steel Creek, and wildlife due to nonradiological sources. Also the increased thermal discharge to the Savannah River has been projected. Have these projections taken into account potential future changes in Savannah River flow characteristics as a result of recent upstream modifications? If river flow drops significantly below previous values, how high would the river temperature go?	The thermal effects in the Savannah River resulting from the direct discharge of L-Reactor cooling water have been evaluated under a wide range of river flows, including flows less than the 7-day 10-year low flow of 159 cubic meters per second.
EJ-3	In contrast to the description of the adverse effects of certain nonradiological factors, the potential negative impacts from "normal" and accidental introduction of radionuclides and other chemicals are not as well documented. I did not see any assessment of the effects of previous radionuclide spills on Steel Creek and the Savannah River or recent disclosures of aquifer contamination. How adequately and extensively are environmental factors being monitored? On p 4-19 it is indicated that "most chemical contaminants are expected to be transported through the swamp into the Savannah River." On what is this expectation based? Does the swamp not act as a filter? What is the fate of these contaminants as they become part of the sediments? Have previous studies answered any of these questions?	The assessment of previous radionuclide spills on Steel Creek is extensively discussed in Appendix D and summarized in Sections 3.7.2 and 4.1.2.4. Environmental monitoring at SRP and L-Reactor monitoring programs are discussed in Chapter 6.
EJ-4	The assessment of radiation doses resulting from exposure to persistent radionuclides or to isotopes that tend to bioaccumulate appears to be inadequate. For example, calculations of radiation doses resulting from the injection of meat and vegetables are based upon estimates of the contamination of foodstuffs by radioactive material deposited from the atmosphere on	The flow rate in Steel Creek, about 11 times the natural flow rate, would carry the cooling-water effluent from L-Reactor directly to the Savannah River, except during periods of flood which occur about 22 percent of the time. As discussed in Section 4.1.1.5 of the EIS, the water quality of the L-Reactor effluents discharged through the L-Reactor outfall to Steel Creek would be very similar to that of the Intake Savannah River water. In addition, these discharges would be made under an NPDES permit issued by SCDHEC. The comprehensive cooling-water study (Section 6.1.3) will further assess radionuclide and heavy-metal remobilization, deposition, and effects.
		See the response to comment BA-2 regarding the use of bioaccumulation factors. Root uptake by vegetation is not a significant pathway since water from the Savannah River is not used in significant quantities for irrigation; hence, deposition of airborne radioactive material is the most significant pathway.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EJ-5	vegetation (B-14). Apparently, this assumption would greatly underestimate exposure because no account was made of other routes of incorporation of isotopes into vegetation, such as absorption through roots, and no account was made of bioaccumulation. With regard to exposure to those isotopes with long half-lives that persist in the environment, estimates were made of 100-year dose commitments for exposure to H-3, C-14, Kr-85, and I-129; however, a population of 250 million was assumed (B-31) for the dose commitment calculations (Table B-18). The effect that this assumption has on the dose calculation needs to be explained.	The 100-year environmental dose commitments for exposure to H-3, C-14, Kr-85, and I-129 beyond 80 km was based on a U.S. population of 250 million. Should a different population be used, the doses would increase or decrease in a proportional manner.
EJ-6	On page 8-2, lines 8 and 9, it is stated that after decommissioning and decontamination - this area can revert back to its natural state with minimal long-term effects." What is the justification for this view? What is minimal long-term effects? Section 4.6, Decontamination and Decommissioning, sheds little light on this point. Only one paper (a Master's Thesis by Repaske, 1981) had preliminary information or signs that the Savannah River swamp was beginning to recover. Will the proposed new indignity to this ecosystem be more drastic than that of the previous operating period of the L-Reactor? What other changes, such as in water table levels, use of Savannah River, or regional industrial development, have altered the regional ecosystem since 1951. The L-Reactor and its attendant activities are part of a larger ecosystem, one which is changing. I do not find any basis in this Draft EIS to support the thesis that this area will become productive over a long-term (not defined) period. Sincerely yours, F. John Vernberg	Justification for this view is based on the documented changes over time to the Steel Creek ecosystem following the previous operation of the L-Reactor. Minimal long-term effects means that the Steel Creek ecosystem, after a period of approximately 15 to 20 years, will achieve the level of community diversity and productivity that is present today. Changes to water levels in important aquifers is discussed in Sections 3.4.2, 4.1.1.3, 5.1.1.4, and 5.2.3 of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF RICHARD E. WATKINS November 14, 1983 Mr. Melvin J. Sires III U.S. Dept. of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801 Dear Sir:		
EK-1	It is disturbing that the current plans for restarting the L-Reactor will result in the discharge of hot water into Steel Creek. This water, much hotter than permitted by state regulations, will needlessly destroy 1000 acres of wetlands and will flush cesium into the Savannah River. Groundwater contamination is another significant concern.	See the response to comment AA-1 regarding cooling-water alternatives.
EK-2	Some of the environmental impacts are clearly avoidable, and steps must be taken before startup of L-Reactor to avoid these impacts. Savannah River Plant must be required to comply with the federal and state environmental standards which commercial nuclear reactor sites must meet.	See the response to comment AA-2 regarding the relationship of radiocesium and radiocobalt concentrations to EPA drinking-water standards, and the response to comment AJ-1 regarding ground water.
EK-3	Some of the environmental impacts are clearly avoidable, and steps must be taken before startup of L-Reactor to avoid these impacts. Savannah River Plant must be required to comply with the federal and state environmental standards which commercial nuclear reactor sites must meet.	See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state regulations and to take all reasonable steps to mitigate impacts, and the response to comment BF-7 regarding the differences between SRP reactors and commercial light-water reactors.
Yours truly, Richard E. Watkins 2-B Kirkwood Apts. Camden, SC 29020		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF ALFRED H. VANG		
State of South Carolina Water Resources Commission Alfred H. Vang Executive Director November 14, 1983		
Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P. O. Box A Aiken, South Carolina 29801		
ATTENTION: EIS for L-Reactor		
Dear Mr. Sires:		
The Water Resources Commission staff has reviewed the "Draft Environmental Impact Statement, L-Reactor Operation, Savannah River Plant" and submits the following comments for consideration in developing the Final EIS and reaching an ultimate decision on the project.		
EL-1	1. As part of the scoping process for the EIS, we requested a thorough evaluation of the effect of project operation on surface water use throughout the Savannah River Basin. While the Draft EIS does contain some information on water use, we believe more evaluation is desirable. The evaluation should consider total SRP streamflow needs for water supply and waste assimilation, including thermal effluent, and the impact of these needs on current and projected water use throughout the Basin. Consideration should be given to a substantial interbasin transfer being planned by the City of Greenville, South Carolina and to water use agreements being negotiated by the States of South Carolina and Georgia with the Corps of Engineers (for withdrawals from Clarks Hill, Hartwell and Russell Lakes). All water uses both upstream and downstream should be included in this evaluation.	Withdrawal of Savannah River water for restart of L-Reactor and ongoing SRP operations are discussed in Section 4.1 and 5.2 of this EIS. Wastewater discharges from SRP will be in compliance with the NPDES permits as issued by the South Carolina Department of Health and Environmental Control. Alternative thermal mitigation measures for L-Reactor are presented in Section 4.4.2 of this EIS. DOE is presently conducting a thermal mitigation study for the selection of thermal mitigation measures for SRP operating reactors. The Corps of Engineers maintains that in accordance with its agreement with Duke Power Company, the interbasin transfers from Lake Keowee to the City of Greenville cannot have an effect on the ability of the Corps of Engineers to generate electrical power at Lake Hartwell and Clarks Hill. The Corps of Engineers is presently assessing the request by the States of

M-364

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		South Carolina and Georgia regarding the withdrawal of water from Lake Hartwell and Clarks Hill. This assessment will include the ability of the Corps of Engineers to maintain its navigation project below the New Savannah Bluff Lock and Dam and to meet its electrical power generation requirements. This assessment will also consider the effects of the interbasin transfer. Until such time that the Corps of Engineers completes its assessment, flows below the New Savannah Bluff Lock and Dam will be maintained at the current levels by the Corps of Engineers.
EL-2	2. The consumptive water use by L-Reactor and other SRP operations should be indicated, rather than simply stating that most water withdrawn will be returned.	Based on Neill and Babcock (1971)--referenced in Chapter 4--it is estimated that the surface-water consumptive use for L-Reactor will be 0.85 cubic meter per second.
EL-3	3. It is the position of this agency that the L-Reactor should be in compliance with State water quality standards for temperature at the time of restart. This position has been provided to the South Carolina Department of Health and Environmental Control as part of the NPDES permit review process. We believe that any private industry proposing a similar thermal discharge would be required to comply with State standards and DOE should be subject to the same requirement.	L-Reactor operation will be in compliance with the NPDES permit issued by SCDHEC.
EL-4	The Draft EIS clearly indicates that DOE's preferred cooling water alternative of once through cooling with direct discharge to Steel Creek will 1) violate State thermal standards, 2) produce severe adverse impacts on the Steel Creek ecosystem, 3) alter the environment by greatly increasing streamflow, 4) introduce large amounts of suspended solids to Steel Creek, and 5) resuspend radioactive Cesium and Cobalt deposited in Steel Creek sediments. All of these adverse impacts could be alleviated by use of the recirculating mechanical draft cooling tower alternative discussed in the Draft EIS. In the interest of protection of our water resources and water users, we recommend the recirculating mechanical draft cooling tower method as the preferred alternative incorporated in the Final EIS.	Section 4.4.2 of the EIS, which discusses cooling-water mitigation alternatives, has been revised based on public comments received on the draft EIS. Specifically, Section 4.4.2 has been revised to provide a detailed discussion of additional combinations of various cooling-water systems. In Section 4.4.2, each of the cooling-water mitigation systems is evaluated for attaining the thermal discharge limits of the State of South Carolina. Section 4.4.2 and a revised Appendix I, Floodplain/Wetland Assessment, discuss the wetland impacts of each of the systems considered. The Department of Energy has been reviewing and evaluating alternative cooling-water systems for L-Reactor. Based on these reviews and evaluations, and consultations with representatives of the State of South Carolina regarding a mutually agreed upon compliance approach, a preferred cooling-water mitigation alternative is identified in this EIS. This preferred cooling-water alternative is to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EL-5	4. In order to insure uniform application of and compliance with requirements of the Resource Conservation and Recovery Act (RCRA), we support the position of administration of RCRA by the South Carolina Department of Health and Environmental Control for L-Reactor and other SRP operations.	biological community in the lake. The Record of Decision prepared by the Department on this EIS will state the cooling-water mitigation measures that will be taken which will allow L-Reactor operation to be in compliance with the conditions of an NPDES permit to be issued by the State of South Carolina. As stated in Chapter 7 of this EIS, the hazardous-waste management program of DOE meets the technical requirements of the EPA hazardous-waste regulations, and is compatible with the State of South Carolina DHEC requirements. SRP will cooperate with SCDHEC on all matters concerning solid and hazardous waste management. Recently, DOE and EPA have signed a memorandum of understanding regarding the applicability of RCRA to DOE's military activities. It is DOE's position that state RCRA permitting authority does not apply to activities or substances subject to the requirements of the Atomic Energy Act of 1954, as amended. The underlying issues of applicability were recently reviewed in the District Court of Tennessee. A decision adverse to DOE's position was rendered on April 3, 1984. The Department of Energy does not plan to appeal this decision to the Circuit Court of Appeals. The Department will implement the requirements of RCRA at the Savannah River Plant in accordance with the MOU, and will work closely with SCDHEC on all activities related to hazardous-waste management.
EL-6	5. All of the mitigation alternatives discussed in Section 4.4 relating to safety systems, cooling water, liquid waste disposal and disposal of 186-Basin sludge are not preferred by DOE due to cost and/or impact on production schedule. We feel there are considerations more important than production schedule and cost, and that mitigation alternatives which protect the environment and public safety should be selected and committed to by DOE in the Final EIS.	Chapter 4 provides the decisionmaker the necessary information on economic, engineering, and environmental factors to formulate a thorough, reasoned, and knowledgeable decision on the potential implementation of mitigation alternatives in relation to the need for defense nuclear materials. The Record of Decision on the EIS will address alternatives considered in reaching the decision, environmentally preferable alternatives, and preferences for alternatives based on the technical, economic, and statutory mission of the agency.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EL-7	6. It is stated in the Draft EIS that no adverse ecological impacts are expected on the Savannah River except near the mouth of Steel Creek. In support of this expectation, studies by the ANSP (1953, 1957, 1961, 1967, 1970, 1977) are cited on page 4-18. Are these studies considered by DOE to be comprehensive and detailed enough to document that past L-Reactor and other SRP operations have not impacted Savannah River biota?	The ANSP references on page 4-18 of the draft EIS are to the statement "... to monitor the effects of SRP operations on the general health of the Savannah River." The statement that "... no major changes in the presence of species have occurred from past Savannah River operations at their stations or are expected to occur from the addition of heat and cooling water from L-Reactor..." is referenced by Matthews, 1982. The cited references and the statements that they reference do not refer to ecological impacts near the mouth of Steel Creek. The scope of the studies conducted by the ANSP are intended to evaluate the general health of the Savannah River; they are not meant to be a detailed study of the impacts of the SRP on a specific system such as Steel Creek.
EL-8	7. On page 4-12, reference is made to "...thermal effluent criteria of the South Carolina Water Classification Standards System (SCDHEC, 1981)...." It should be noted that these thermal criteria are actually thermal standards.	The word "criteria" has been changed to standards in the applicable sections of this final EIS.
EL-9	8. Section 3.4.1.1 indicates that the Corps of Engineers attempts to maintain a minimum flow of 178.4 cubic meters per second (6297 cfs) at the New Savannah Bluff Lock and Dam. Our information indicates that this figure should be 164.3 cms (5800 cfs).	In its <u>Final Environmental Impact Statement, Operation and Maintenance of Clarks Hill Lake, Savannah River, Georgia and South Carolina</u>, the Army Corps of Engineers (1981) states "3.63 Navigation. A minimum flow of 5,800 c.f.s. is required below New Savannah Bluff Lock and Dam for navigation. The Clarks Hill discharges are regulated to meet this minimum with re-regulation provided at Stevens Creek Dam. A discharge of 6,300 c.f.s. is normally provided 80 percent of the time."

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EL-10	9. Page S-5, fourth paragraph mentions pollutants in the Congaree Formation, but no mention is made of chlorinated hydrocarbons in the Tuscaloosa Formation.	In 1982, wells producing from the Tuscaloosa in A-Area were found to have low concentrations of chlorinated hydrocarbons; concentrations in water samples from these wells ranged from less than 3 to less than 27 micrograms per liter. Entry of chlorinated hydrocarbons into these wells is believed to have resulted from Tertiary groundwater migration through defects in the cement grout of at least one production well to the Tuscaloosa (Geraghty & Miller, 1983). Chlorinated hydrocarbons above the limit of detection (1 microgram per liter) have not been found in recent M- and A-Area wells drilled to monitor Tuscaloosa water quality. One of these new wells is located within 80 meters of the A-Area production well (53A) that previously exhibited the highest concentration of chlorinated hydrocarbons. The summary of this final EIS has been revised to include a discussion of the chlorinated hydrocarbon contamination in the Tuscaloosa Formation.
EL-11	10. Page 3-25, fourth paragraph states that the tan clay had disappeared in the M-Area. Although this is correct, there has been no mention of this unit previously and no description.	The tan clay is the lowest unit of the Barnwell Formation (Section F.2.7.1). Section 3.4.2.1 has been revised to provide a brief discussion of the tan clay.
EL-12	11. Page 3-36, second paragraph states that "In areas where downward head differential does not exist, such as M-Area...." Although this is correct, there has been no mention of this unit previously and no description.	The text of the EIS has been revised to read "In areas where downward head differential exists, such as M-Area, the draw-downs increase the natural downward head differential in the area immediately around the pumping wells."
EL-13	12. Page 4-7, third paragraph should read "...and 58.3 cubic meters per minute" instead of cubic meters per second.	The text of the EIS has been revised.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EL-14	13. Same paragraph as in 12, above, should read "...the 30-kilometer square area..."	Within about a 32-kilometer radius of SRP (an area of over 3216 square kilometers) the current (1983) projected water use from the Tuscaloosa Aquifer is estimated to be 63 cubic meters per minute (see Section F.3.1). The study area for the ground-water flux calculation lies within the 3216 square kilometer area (see Section F.4.2).
EL-15	14. Page 5-12, second paragraph states that "Local water levels at pumping wells are not expected to continue to decline appreciably." But they have been declining since about 1978 and with increased pumpage both in and peripheral to the plant site, they could continue to decline.	From 1972 to 1981 there has been a general decline in winter precipitation. This accounts in part for the declining water levels as shown by well AK-183 in the outcrop area (Section 3.4.2.5). Calculations indicate that the decline in SRP monitoring wells is associated primarily with increased pumping at SRP. The text has been revised appropriately. Also see the response to comment BT-7 regarding ground water.
EL-16	15. Figure F-9 on page F-20 shows the 172 foot water elevation in well P3C is closer to the 180 foot contour than is the 177 foot water elevation of well P54.	The 180-foot contour was drawn to "honor" all data points. Neighboring data points show elevations of 173 and 177 feet. Appropriate weight has been given to each of the three elevations in this cluster when drawing this contour.
EL-17	16. Figure F-22, page F-50. The water table surface should be labeled.	The water table in the referenced figure has been labeled.
EL-18	17. Figure F-28, page F-69. The Tuscaloosa piezometric surface should have an arrow to clarify location. The arrow for the Congaree piezometric surface is mislocated.	The figure has been modified to designate the locations of the Tuscaloosa and Congaree piezometric surfaces.
EL-19	18. The piezometric maps of various aquifers in various areas should be contoured on an interval that would show the effects of the production wells on the water levels (cones of depression).	The piezometric maps were drawn from data obtained in monitoring wells. The cones of depression at SRP are not extensive, particularly those in the Tuscaloosa Formation. The density of monitoring wells is insufficient to show the cones of depression. Information on cones of depression in the Tuscaloosa Formation is provided in Section F.4.3, Siple (1967) and Du Pont (1983; DPST-83-829).
EL-20	19. Some note should be made as to which wells are pumping, how long, and the withdrawal rates.	Individual well pumping rate information is not measured at SRP; instead, process and domestic ground-water use is measured on a system basis in each "Area" of SRP. Historical data (1968-1983) on ground-water withdrawal rates are provided on an "Area" basis in Section F.3.2. Other information is

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		provided in Siple (1967). Pumping histories of 12 selected wells from several formations have been portrayed graphically. Pumping information on an "Area" basis will be reported to SCWRC on a quarterly basis starting with the fourth quarter of 1983.
EL-21	20. The text refers to data in the metric system whereas, many of the figures are labeled using the English system. They should be consistent.	Metric units were used whenever practicable. When English units were employed, appropriate conversion factors were provided. Re-drafting art work to change, for example, contours from English to metric units could distort the interpretations of the original preparer.
EL-22	21. No mention is made of the clastic dikes located in and near the H-Area seepage basin. These dikes provide a mode for concentration of beta emitters and allow for more rapid transport of pollutants to Four Mile Creek.	Clastic dikes were mapped during the geotechnical investigations for the Defense Waste Processing Facility (DWPF). The map area included H-Area. This mapping effort does not show the presence of clastic dikes near the H-Area seepage basins. Clastic dikes at SRP are, typically, less permeable than the surrounding sediments. These dikes have an ironstone margin with a clay center. Ground-water travel times from H-Area seepage basins to seep line springs along Four Mile Creek have been measured by tracking tritium in the plume. Representative travel times are reported in Section F.5.3.
EL-23	22. In several instances the text refers to the head in the Congaree being lower than that of the Tuscaloosa because the Congaree has been incised by several streams allowing for an area of discharge. Although this is true, the major reason for the lower head is that in the south-western part of the plant site the recharge area for the Congaree is lower than the recharge area of the Tuscaloosa.	The pattern of upward head differential between the Tuscaloosa and the Congaree and the increase in this differential from the northeast towards the southwest (along an axis nearly coincident with Lower Three Runs Creek) suggests that stream/river incision plays the dominant role, not differences in elevations of recharge zones. The effects of incision by Upper Three Runs Creek and the Savannah River on the Congaree piezometric surface are discussed and displayed in cross sections in Section F.4.1.
EL-24	23. In all of the piezometric maps, note should be made as to whether the water levels were made during pumping or under static conditions.	Water levels used to construct piezometric maps were measured in monitoring wells (not in pumping wells) during normal plant operations, including the withdrawal of process and domestic water from ground-water sources. Section F.1 of the FEIS has been revised to indicate conditions during ground-water level measurements.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EL-25	24. As we pointed out during the scoping process, approximately 6000 wells have been drilled at the SRP. Many of these (approximately 600) were pre-existing domestic wells, some penetrating the Tuscaloosa, that have been abandoned. The status of these wells is not known, but any open holes or rusted-out casings provide a direct route for water from contaminated shallow aquifers to the Tuscaloosa. Since this situation was not addressed in the Draft EIS, please include it in the Final EIS.	The text of Section 3.4.2.3 has been modified and a new Section F.7 has been added in this Final EIS to reflect this concern. No abandoned wells are known to exist at or adjacent to waste disposal sites that will be utilized by L-Reactor or SRP.
EL-26	25. The presence of mica and kaolinitic clays in the subsurface will make ion exchange a significant problem in controlling the movement of contaminants in ground water, especially in the McBean Formation. Please address this situation in the Final EIS.	The presence of micaceous and kaolinitic subsurface materials was considered during computation of dose commitments that could result from liquid releases via the ground-water path (seepage basin to onsite streams). Radionuclide concentrations at outcrops along streams were derived from input obtained from a ground-water model of radionuclide transport. The source-term radionuclides and their daughter products were considered. Radioactive decay, ion-exchange, and the adsorptive and absorptive properties of the micaceous and kaolinitic clays of the SRP were also considered (Section B.2). Ion-exchange, adsorption and absorption effects are accounted for by the distribution coefficient (Kd). In performing these calculations appropriate Kd-values were assigned each radionuclide species.

Thank you for the opportunity to comment on your Draft EIS. Please contact us if you have any questions regarding our comments.

Sincerely,

Alfred H. Vang
Executive Director

AHV:fw
cc: S. C. Water Resources Commissioners

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	STATEMENT OF RUTH THOMAS	
	Environmentalists Inc. Founded 1972 November 12, 1983	
	Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, South Carolina 29801	
	Dear Mr. Sires:	
	FINAL COMMENTS ON THE L-REACTOR DRAFT ENVIRONMENTAL IMPACT STATEMENT	
	<u>Introduction:</u>	
EM-1	In our Preliminary Comments of October 6, 1983, we requested that a discussion meeting be arranged between consultants with NUS Corporation consultants, state/Federal officials and commenting organizations for the purpose of addressing the defects of the Draft Environmental Impact Statement (draft EIS) related to the proposal to restart the L-Reactor. Such a meeting was not arranged by the Department of Energy (DOE).	See the response to comment AB-21 regarding DOE's letter of October 31, 1983.
	<u>THE DRAFT EIS FAILS TO QUALIFY AS A SCIENTIFIC DOCUMENT:</u>	
EM-2	1. Failure to adequately identify specific references with support statements and conclusions in the text.	The EIS listed appropriate references for the subject matter covered.
	2. In the cases when a reference is included in the text, no particular section of the report or the particular pages involved are not identified.	
EM-3	3. Failure to include references which provide the specific and detailed data needed to evaluate the proposal to restart the L-Reactor. The following list of documents	The list of references provided was not needed to support any information given in the EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Includes some of the significant sources of information missing from the Draft EIS.	
	a. <u>Du Pont (E. I. du Pont de Nemours and Company), Control and Treatment of Radioactive Liquid Waste Effluents at the Savannah River Plant, DP-1349, W. R. Jacobsen, W. L. Marter, D. A. Orth, C.P. Ross, 1974 (This relates to leaks to storm sewers and discharges to seepage basins.)</u>	
	b. <u>Tritium Toxicity: Effect of Low-Level H₂O Exposure on Developing Female Germ Cells in the Mouse, R. Lowry Dobson and Mary F. Cooper, Radiation Research 58, 91-100, 1974.</u>	
	c. <u>U.S. Geological Survey, Hydrology of the Low-Level Radioactive-Solid-Waste Burial Site and Vicinity Near Barnwell, South Carolina, Open File Report 82-863, James M. Cahill, 1982. (On page 3-68 the Draft EIS lists a report on Chem-Nuclear prepared by the company itself, the newer findings of the U.S. Geological Survey are not included.)</u>	
	d. <u>Dr. Thomas Mancuso, Study of Health Effects of Radiation Exposure to Workers at Hanford Washington Complex of Nuclear Plants, 1978. (Despite reports of bad peer reviews, only one was negative and that by Dr. Sidney Marks, whose work for the AEC gave him a conflict of interest problem.)</u>	
	e. <u>Appendix II, Regional Tritium Dose Model, testimony of August 1, 1974 at the Federal hearing on the Allied-General Nuclear Services; reprocessing plant, Docket No. 50-332 (This testimony related to the fact that the transfer of tritium is not monodirectional.)</u>	
	f. <u>Du Pont, Leakage from Waste Tank 16, DP-1358, W. L. Poe, November 1974. (Numerous other reports of accidents, and problems at the Savannah River Plant are missing from the Draft EIS; reference sources.)</u>	
EM-4	4. The use of classified and internal reports to support statements in the Draft EIS, yet these are unavailable to reviewers.	See the response to comment AB-2 regarding availability of classified documents.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EM-5	5. Cases of evidence in referenced reports conflicting with statements in the text. (See page 4-144, Gibbons study of 1974 conflicts with statements on page 4-18). <u>THE DRAFT EIS FAILS TO FULFILL THE REQUIREMENTS OF THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) FOR EXAMPLE:</u>	See the response to comment AB-14 regarding the differences in the statements.
EM-6	1. Failure to provide adequate evidence regarding the benefits of the proposal to restart the L-Reactor.	See the response to comment AB-4 regarding "benefits."
EM-7	2. Failure to provide adequate evidence regarding the costs of restarting the L-Reactor, in terms of environmental and health damages and in terms of detrimental impacts to businesses of the state, including tourism.	There is no evidence to suggest that the restart of L-Reactor will have a detrimental impact to the businesses of the state including tourism. To the contrary, as discussed in Section 4.1.1.1 of the EIS, L-Reactor operation is expected to have annual total local expenditures in materials and services of approximately \$3 million and a total payroll and overhead expenditure of about \$21 million. These expenditures are expected to create about 50 regional job opportunities and to produce an additional direct and indirect income of another \$3 million. The total economic benefit to the SRP region during L-Reactor operation will amount to 400 direct and indirect job opportunities, about \$25 million in direct and indirect annual income and payroll, and \$3 million in direct annual expenditures on materials and services.
EM-8	3. The lack of adequate evidence related to both Costs and Benefits makes the balancing process of the NEPA law impossible to carry out.	See the response to comment AB-4 regarding balancing of costs and benefits.
EM-9	4. The fact that the Draft EIS is not a qualified scientific document means it is also unfit to serve as the basis of reaching decisions regarding the proposal to restart the L-Reactor.	The EIS was prepared in accordance with NEPA guidelines and CEQ regulations. The EIS was based on extensive published reports and accurately depicts the environmental consequences of the proposed restart of L-Reactor.
EM-10	5. Failure to comply with the NEPA requirement of environmental consideration "to the fullest extent possible" as mandated in Section 102 of the law. This includes the subject of alternatives to the proposed action and alternatives which would reduce the detrimental effects of the proposed restart of the L-Reactor. See our Preliminary Comments regarding production alternatives, safety alternatives and cooling water options.	See the responses to comments AB-4 and AB-5 regarding this EIS and NEPA.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>QUESTIONS AND COMMENTS:</u>		
EM-11	1. Explain the conflict between evidence about the toxic nature of radioactive materials and the DOE's conclusion that an approximate one third increase in the amount of these lethal substances (increase in production, storage, burial and release by intention and accident) at the Savannah River Plant would have no significant effect on the environment and the public's health.	There is no conflict inherent in the conclusion that an increase in the release of radioactive materials by one-third will not significantly affect the environment and public health. A one-third increase in an insignificant quantity results in a quantity which is still insignificant. Section 5.2.7 of the EIS presents health effects from all SRP and nearby nuclear facilities in the tenth year of L-Reactor operation that are estimated to be a total of 0.02 cancer fatality. Expected cancer death rates in a population of 852,000 (within 80 km) plus 317,000 (downstream water consumers) based on 1979 South Carolina and Georgia rates of about 147 per 100,000 population would be about 1720 per year. Thus, Savannah River Plant contributions (0.02 cancer fatality) would not change the projected cancer fatality rate by a detectable amount (1720 to 1720.02 per year).
M-375 EM-12	2. List the research consulting firms the DOE considered for preparing the Environmental Assessment? for the Draft EIS?	Both the EA and the EIS are DOE documents; DOE is solely responsible for their preparation and contents. DOE contracted with NUS Corporation as a technical support contractor to provide assistance to DOE/SR in the preparation of documents to comply with the NEPA. DOE followed its contracting and procurement regulations for competitive contracts before selecting NUS. Sixty-nine companies expressed an interest in bidding on the contract in 1980. DOE reviewed the prospectus of each company. The NUS Corporation was selected from among these companies to provide this technical support. The L-Reactor NEPA documents (the EA and EIS) were one task assigned to this contractor.
EM-13	3. Describe the criteria used to judge the knowledge, experience, and objectivity of the research firms considered.	With respect to experience, DOE developed an exclusion criterion that stated "The offeror must have prepared an Environmental Impact Statement (EIS) as defined in Section 102(2)(c) of NEPA for Federal agencies which related to the nuclear fuel cycle and radioactive waste management activities." To narrow the competitive field to those companies with expertise in the nuclear fuel cycle and NEPA experience, DOE required the contractor to have expertise in the following areas: socioeconomic, radiological dose assessments, meteorology, geology, hydrology, ecology, biology, seismology, and engineering (civil, mechanical, nuclear).

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EM-14	4. List the reasons why the DOE selected the same researchers to do the Draft EIS as those who had prepared the Environmental Assessment.	See the responses to comments EM-12 and EM-13. Because NUS Corporation assisted DOE in the preparation of the EA, it was familiar with the L-Reactor project and environmental effects. DOE is responsible for the technical accuracy of the EIS. Also see the response to comment AB-20 regarding the EA and its support documentation.
EM-15	5. The Draft EIS points out that numerous studies have been done on the health effects caused by exposure to radiation. The report, however, lists only a few studies as references. None of the animal research and none of Dr. Alice Stewart's studies are included. Numerous other studies are missing including Dr. Samuel Milham's findings of "too much cancer at Hanford" and Dr. Thomas Mancuso's follow up study on Hanford.	The EIS relies in general upon the reports and recommendations of the most authoritative institutions with respect to radiation-induced health effects, including the Committee on Biological Effects of Ionizing Radiations of the National Academy of Sciences, National Research Council. The studies of Stewart, Milham and Mancuso have been examined and dismissed as lacking in statistical power in the 1980 report of that committee.
EM-16	The 3 health effect references chosen for Section 6 on Studies and monitoring were all done by one person, H. I. Sauer (page 6-13). According to those preparing the Summary, there is a need to "fill in missing time periods and update mortality rates through 1978" (page S-11) in these reports of Dr. Sauer. Unless the Final EIS includes consideration of the evidence contained in numerous health effect studies, the DOE may be accused of manipulating information related to the L-Reactor restart proposal. In a speech at a January 1983 meeting of the Aiken Rotary, Du Pont's Vice Chairman, Richard Heckert stated that "(O)ften scientific fact are ignored," when nuclear issues are being considered. He went on to say that "(S)ometimes unsupported scientific arguments are created for the occasion," "in still other cases," he added, "valid data are manipulated to support predetermined political goals rather than to reach valid scientific conclusions." The DOE needs to review its own practices.	The study by H. I. Sauer, which was in progress when the DEIS was prepared, has now been completed and a report is being prepared. The study was reviewed by a panel of epidemiology experts on October 25-26, 1983. This panel, which was convened by the U.S. Public Health Service's Centers for Disease Control at the request of DOE, included epidemiologists from the health departments of the States of Georgia and South Carolina. A report of the panel's review is expected by the end of 1983. In Professor Sauer's study, he concludes that "the hypothesis that there is increased mortality due to the operation of SRP has been shown to be without foundation. The differences between U.S. rates and the rates for counties in South Carolina and Georgia, analyzed either cross-sectionally or as trends over time, do not display any consistent pattern. Though erratic and heterogeneous when organized from the angle of possible SRP induced radiation effects, the data might be better explainable when correlated with other factors of natural, socioeconomic or cultural character."
EM-17	6. There are too many defects in the Draft EIS and in the responses the DOE made to those testifying orally and in writing to address all of them. We, therefore, selected the first ten pages of Dr. Roger Coate's Statement of May 24, 1983 to study. This particular testimony was chosen because of Dr. Coate's knowledge of numerous subjects related to the proposal to restart the L-Reactor.	Responses to the additional comments and answers are provided in the following comments and responses. Due to the format of this appendix a complete copy of the marked copy cannot be provided; however, a complete copy of the attachment is enclosed in the DOE report documenting the comment period on the Draft EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	We added comments related to the information he presented and related to the answers supplied by the DOE. A copy of these comments is attached. These notes demonstrate that more questions were raised by the DOE's responses and that conflicting information was not cleared up. In some cases specific questions or comments were not addressed.	
	We ask that full consideration be given to our Preliminary Comments, these Final Comments and our notes related to Dr. Roger Coate's testimony.	
	Sincerely,	
	Ruth Thomas, Authorized Representative Environmentalists, Inc. 1339 Sinkler Road Columbia, S.C. 29206 Tel. 803-782-3000	
	Attachment A: Notes on Dr. Coate's testimony	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	We have prepared notes on Dr. Coate's statement and DOE's response presentations to show that the agency has not adequately addressed issues raised in this testimony either in its comments here or in the Draft Environmental Impact Statement (EIS). (Boxed in areas are E. I.'s notes) Ruth Thomas Environmentalists, Inc. 1339 Sinkler Road Columbia, S.C. 29206 tel. 782-3000 Only through page B-58.	
EM-18	From my review so far of the Draft EIS, it appears that the basic faults pointed out about the EA (nos. 2, 3 and 4) exist in the Draft EIS.	Comments 2, 3, and 4 were addressed in the responses to U-7, U-14, and U-4, respectively, of Dr. Coate's statement.
EM-19	The position that "National Security" also applies to maintaining public well-being of the public from operation of SRP is a view which needs to be stressed by more people. It relates to NEPA, the balancing of costs vs benefits. There is nothing in the NEPA law of 1969 which exempts DOE from full compliance with this federal law.	See the responses to comments AB-4 and AB-5 regarding balancing and disclosure of classified information in this appendix.
EM-20	The Draft EIS as it now exists does not meet the requirements of the NEPA and the EA did not. Did the DOE have lawyers familiar with NEPA as advisors? What legal experience do the NUS Corporation consultants have? (36 of the preparers of the Draft EIS are with NUS Corp.)	See the response to comment AB-4 in this appendix regarding information in this EIS. The EA and the EIS were prepared by NUS under the technical direction of DOE, including the General Counsel from the DOE Savannah River Operations Office and DOE's Office of General Counsel. All these lawyers are familiar with the NEPA. The Office of the General Counsel approved the EA, FONSI, and Draft EIS. NUS Corporation is an engineering and environmental consulting firm with extensive experience in preparing environmental NEPA documents. NUS' legal experience has no bearing on its ability for preparing NEPA documentation.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EM-21	Citizens and citizens' organizations have the right to intervene and be parties to administrative hearings at which cross-examination and testifying under oath are helpful in resolving conflicting information. (Under the NEPA law.)	NEPA requires that the public be allowed to comment during the NEPA process (42USC,4332(2)(c)) and the Agency is required to respond to those comments (32 CFR 651.304). There is no statutory requirement for public hearings. (<u>Como-Falcon Community Coalition Inc. v. Dept. of Labor 609F2d 342 (8th Cir. 1979).</u> If a hearing is held, it is up to the agency to decide on the procedures.
EM-22	The Draft EIS appears to have as its main purpose to minimize the effects of restarting the L-Reactor and to minimize the damages which have already happened.	As discussed in Section 1.2 of the EIS, the purpose of the EIS is to analyze the potential environmental consequences of the proposed restart of L-Reactor in compliance with Section 102(2)(C) of the National Environmental Policy Act of 1969, as amended, and the Energy and Water Development Appropriations Act, 1984. The potential environmental impacts of the proposed restart of L-Reactor are described in the EIS and are based on projections of the effects of expected nonradiological and radiological operational releases on the current environmental baseline. Also see response to comment AT-3 in this appendix regarding the scope and content of this EIS.
EM-23	In the DOE's defense of the EA, chapters 3 and 4, the agency refers to the number of pages as if the quantity of material was the important criteria rather than the presentation of as complete and accurate a record of evidence as possible. (NEPA)	See responses to comments AT-3 and AB-1 in this appendix regarding this EIS and the EA.
EM-24	The alternative discussions of the Draft EIS are defective as noted in EI's Comment Letter.	See the responses to comments AB-5 through AB-19 in this appendix regarding alternatives in this EIS.
EM-25	We did not find the Johnson (1977) report listed in the Draft EIS nor did we find accounts of incidents, accidents, equipment failures, accidental releases. It is unclear what amounts of various radioactive gasses and fallout have been routinely released from reprocessing plants, other plants.	The Johnson (1977) report, in discussing 75 release incidents, was referring to 75 incidents in the solid waste burial ground which resulted in localized release of radioactivity (ERDA 1537, Chapter III, Section 2 (1977)). These involved burial of contaminated equipment, sand blasting to decontaminate equipment, burning organic solvent, and accidental fires. Contamination was confined to the burial ground except for three incidents which resulted in minor contamination outside the burial ground fence. Improved operating procedures have greatly decreased the frequency of abnormal incidents in recent years.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EM-26	The information about accidental tritium releases is incomplete. We could not locate among the references the approximately 200 documents related to tritium releases and referred to the DOE letter of October 4, 1983.	See the response to comment AB-10 in this appendix regarding tritium releases.
EM-27	What have been the routine and accidental releases of iodine from the SRP reactors? The fact that local milk samples have contained ST-90 suggests other fission products were also released. Why wasn't milk checked for radiiodine each year the SRP facilities have operated? at local farms?	The major sources of iodine releases are the Separations Areas. For the 10-year period 1971-1980 the three operating reactors at SRP released a total of 0.077 Ci of Iodine-131 to the atmosphere, 2.65 Ci to surface streams, and 0.32 Ci to seepage basins. (Reference: Ashley, C. Zeigler, C.C. and Culp, P.A., "Releases of Radioactivity at the Savannah River Plant 1954 Through 1980," DPSPU 81-25-1, 1982.) There has been no evidence that strontium-90 in locally produced milk is of SRP origin. Sr-90 and other radionuclides in milk (except H-3 and I-131 during specific periods) are attributed to fallout from nuclear weapons tests. In the early days of the nuclear industry, the importance of the iodine-cow milk exposure pathway was not recognized. Routine monitoring of cow milk began at SRP in early 1957.
EM-28	At the Barnwell plant hearings, the Iodine-131 predictions were 50 times too low. What has been done to see if SRP predictions are off?	Releases of Iodine-131 at SRP are based on actual measurements and thus represent operating experience.
EM-29	Where in the Draft EIS is consideration given to the fact that people in the SRP area were exposed to the high Iodine-131 releases in the early years of the SRP as well as later releases in terms of the added radioactive pollution from the L-Reactor being an injury to those already harmed? Particularly, in relation to thyroid damage?	See the response to comment EM-27 in this appendix.
EM-30	The statements about reductions in the number of accidents and leaks conflicts with reports of there being more accidents in 1979-1980 - 108 each. *In 1975 there were 38) Richard Denise of DOE told the Atlantic Constitution that one reason was "personnel turnover."	The DOE keeps records of all events which are outside of the normal operating conditions or deviate from normal operating procedures. Most of these events do not result in accidents or leaks. Any events which have an offsite effect are reported to the public in the annual report series entitled <u>Environmental Monitoring in the Vicinity of the Savannah River Plant.</u>

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EM-31	According to Wm. Stratten, reactor expert of Los Alamos, old nuclear plants require more maintenance than when they are new.	The Savannah River Plant has a continuing program to maintain production facilities in a safe operating condition. This includes replacement of equipment when necessary and updating equipment to stay abreast of improved technology.
EM-32	The Draft EIS makes no reference to iodine releases and other recorded releases as far as we can determine. The SRP Operations Office, 1982 does not appear to have been used as a reference by the preparers of the Draft EIS, nor Health Physics reports, nor all of the tritium documents.	Estimates of releases of radiiodine and other radionuclides (Chapters 4 and 5 of the EIS) from L-Reactor and support facilities are generally based on the most recent 3 years of operating experience and thus represent current technology and operating conditions.
EM-33	The report "Radioactive Exposure of the Population by Contaminated Air Emitted from Nuclear Plants in the Federal Republic of Germany" (1975) identifies radiiodine via the pasture-cow-milk pathway as the crucial exposure. Why wasn't this reference used? Were the people in SRP area given potassium iodine pills during the accidental releases of iodine and during the early years when I-133 releases were high?	The pasture-cow-milk pathway is the critical pathway for releases of radiiodine to the environment. This pathway is taken into consideration in calculating the radiological effects of operation of L-Reactor and associated facilities. The offsite doses to the thyroid and other organs via the pasture-cow-milk pathway are given in Appendix B of the EIS.
EM-34	It is our understanding that all tritium, K-85 and Carbon-14 are discharged to the air from reprocessing. If no equipment traps these gases and fallout particles, isn't this dumping?	Tritium, carbon-14, and Kr-85 from reprocessing are released to the atmosphere. At present, there are no practicable methods of removing these radionuclides which are in a dilute form in very large volumes of air. The releases have always been well below standards (i.e., offsite doses have always been well below accepted dose standards).
EM-35	What equipment has been added to SRP facilities? What reports document this? What amount of iodine in radioactive form was released prior to the addition of removal equipment? After? What documents include records of tests on milk for radiiodine?	Since startup of SRP, there has been a continuing program to upgrade equipment and facilities to reduce releases of radioactive and nonradioactive materials to the environment. These "state of the art" improvements are the result of research at SRP and elsewhere. Many of these improvements are described in ERDA-1537 (an EIS reference for Chapter 5). Improvements specifically for SRP reactors are also described in the EIS, Sections 2.2, 4.2, and Appendix J. As described in response to comment EM-27 in this appendix, SRP reactors are a minor source of releases of radiiodine to the environment.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EM-36	Misleading statements are used in the Draft EIS including minimizing amounts released (page B-1 of VOI, 2) as well as minimizing detrimental effects.	The statement that the size of radioactive releases will be small (Page B-1 of the EIS) from operation of L-Reactor and its support facilities was intended to reflect the fact that the radiological impact will be small. See the response to comment EM-11. The word "small" in the first paragraph of Page B-1 has been removed.
EM-37	The presentations on tritium are particularly misleading, and in conflict with reports and studies. ("Sources of Tritium and Its Behavior Upon Release to the Environment," D. G. Jacobs, AEC, 1968, "Tritium Toxicity: Effect of Low-Level $^3\text{H}_2\text{O}$ Exposure on Developing Female Germ Cells in the Mouse," R. Lowry Dobson & Mary Cooper, Radiation Research 58, 91-100(1974)-A few examples. Evidence is needed in Draft EIS to support the statements that a majority of tritium released is in the less dangerous form.	Standard dosimetry models used by the Nuclear Regulatory Commission in regulating the commercial nuclear industry were used in EIS dose calculations (see Appendix B of the EIS). The dose models are based on recommendations of the International Commission on Radiological Protection. The EIS does not make the statement that the majority of tritium released by L-Reactor and its support facilities is in the less dangerous molecular form (see Sections 4.1.2.1, 5.1.2.2, and Appendix B of the EIS). Dose calculations were made on the basis that tritium releases are in the more easily assimilatable oxide form.
EM-38	Not enough samples are taken to justify reaching conclusions about accidental releases. Urine samples are only taken of SRP employees, we understand. If the predictions of the pathway are based on incomplete and inaccurate inf., they are not dependable.	Urine samples were analyzed for more than 300 people. This not only included people working at SRP but also members of the plume tracking team, families of SRP personnel living in the plume trajectory, and members of the public in 20 counties of eastern South Carolina and five locations in North Carolina [reference: W. L. Marter, "Environmental Effects of a Tritium Gas Release from the Savannah River Plant on May 2, 1974," DP-1369 (1974)]. Urine samples were also analyzed for on and off plant people during the 1975 tritium release [reference: W. R. Jacobsen, "Environmental Effects of a Tritium Gas Release from the Savannah River Plant on December 31, 1975," DP-1415 (1976)]. Also see the response to comment EM-48 in this appendix.
EM-39	The Draft EIS fails to provide the evidence to support the following statement similar claims.	Of the radionuclides normally released to the environment from SRP operations, only tritium is regularly detectable by routine monitoring procedures. Thus, it is necessary to calculate doses for known exposure pathways and known atmospheric dispersion. The dosimetry model used in the EIS is the same as used by the Nuclear Regulatory Commission for regulating commercial nuclear operations (see Appendix B of the EIS). Dispersion calculations have been confirmed by environmental measurements of tritium.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EM-40	The Draft EIS doesn't explain why residents have not been warned when accident happen which result in more than routine amounts of radiation pollution being released, so they can reduce exposure.	DOE Orders require that DOE-SR notify potentially affected states of incidents at the SRP. It is the State's responsibility, as in the case of commercial nuclear power reactors, to "warn" people in designated zones near the plant in accordance with EPA guidelines. Guidelines for "warning" offsite persons of releases of "more than routine amounts" of radioactivity from SRP have never been approached. Therefore, required protective actions to "reduce exposure" have not been necessary. Though "warnings" have never been required, the DOE and its predecessor agencies, AEC and ERDA, have had memoranda of understanding with the States of South Carolina and Georgia since 1974 to "notify" responsible state agencies of unusual releases of radioactivity or accidents. As indicated in Appendix H of this Final EIS, which has been modified to include the current status of emergency planning activities, much more detailed notification agreements have recently been agreed to with the states and formal emergency planning was completed in March 1984.
EM-41	Draft EIS doesn't explain the contradiction between calculating a tritium cloud pathway and the fact that tritium doesn't necessarily follow wind direction. (Transcript of the Barnwell plant hearings 50-332)	The calculated tritium cloud pathway referred to was for short-term tritium release incidents. Initial direction and speed of travel of the plume was based on meteorological measurements and standard dispersion calculations. The calculations were confirmed by actual measurement of tritium in the environment following the releases.
EM-42	Why weren't the references cited here used in the Draft EIS? Or why weren't the contradictions between DOE's statements and the cited references explained?	See the response to comment EM-37 in this appendix.
EM-43	Draft EIS lacks adequate discussions of redistribution, through such means as by birds, other animals, insects.	Pathway analysis is included in the dosimetry model used (see Appendix B).
EM-44	The draft EIS uses this same approach of "misleading statements 'low-values'"	See response to comment EM-37 in this appendix.
EM-45	Monitoring did not protect the people's health, information wasn't available in time to reduce the inhaling and ingestion of tritium by humans or animals.	No steps were taken to evacuate people in the path of tritium releases to avoid inhalation or ingestion of tritium. It is unlikely that any tritium release from SRP will ever require such action because offsite doses would not warrant the action. Offsite doses were theoretically calculated immediately following the releases and extensive field monitoring was conducted to verify the calculations.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EM-46	Failure to include in the Draft EIS information sources identified here or explain why, or why the AEC reports and other studies disagree. Will the Final EIS correct this and statements which are either unsupported or contrary of evidence in studies, records, transcripts?	See the response to comment EM-2 in this appendix.
EM-47	The conclusion cannot be reached that tritium was carried in a northeastern direction since tritium doesn't follow wind direction. (See testimony of Barnwell plant hearing Docket No. 50-332)	See the response to comment EM-41 in this appendix.
EM-48	Sampling was done along predicted pathway and since the information on which such predictions were based was incomplete and in some regards incorrect the results of the testing are in question. 1,000 samples is too small a number to base conclusions on anyway. 1,000 samples in 11 categories or approximately 90 of each. The Draft EIS also reaches conclusions based on inadequate information and sampling. No control groups are referred to.	The number of environmental samples following the tritium release incident was adequate to determine the area involved (pathway), levels of tritium in the environment, and offsite doses.
EM-49	The Draft EIS lacks evidence to support statements that new equipment and plant operation techniques have been added over the years. Budget information is needed to show how much was spent, when and on what, as well as detailed and documented information describing the changes. Statements about improvements conflict with public statements made by Richard Denise of DOE, when asked about the fact that the number of accidents at the SRP facilities has increased over the years, for example in 1979 and 80 there were 108 each year.	The continuing upgrade program for the SRP reactors, which was inaugurated immediately after reactor startup in 1953, is discussed in Appendix J. About 60 percent of the \$204 million spent on preparations for the L-Reactor restart went to modernize the reactor in the same way the operating reactors have been modernized during the L-Reactor standby period. It has been a continuing concern that the facilities be continually upgraded. To this end a five-part restoration program was undertaken for the period 1981-1987. A total of \$389 million was budgeted of which about \$164 million has been budgeted through 1983. This money is in addition to normal maintenance and new capital projects.
EM-50	In both EA and Draft EIS, preparers apply the "dilution theory" to an atomic age technology. This is inappropriate.	All releases from L-Reactor and its support facilities are monitored and controlled at the release source, i.e., before dilution. Measurements are then also made of the way these releases disperse into the environment.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EM-51	All tritium, K-85 and C-14 are released intentionally. Since these take time to decay to a safe level C-14 the longest 5,750 year half life, they are still a pollution problem.	Although tritium, Kr-85, and C-14 are released to the environment from operation of L-Reactor and its support facilities, offsite doses are small. Also see the response to comment EM-11 in this appendix. The population dose calculations include consideration of a 100-year environmental dose commitment as described in Appendix B.
EM-52	There are not adequate monitoring stations and provisions to determine the locations at which radiation build up has taken place. The Dept. of the Interior points out the limits of monitoring.	The Savannah River Plant has the most comprehensive environmental monitoring plan of any nuclear facility in the United States. There is no basis for the statement that monitoring stations are inadequate. Monitoring stations are at numerous locations so that there is little likelihood that there will be an undetected buildup of radioactivity. See Chapter 6 of the EIS.
EM-53	Agree that understanding of radiation and its harmful effects is substantial. There are animal studies, studies of X-ray patients, those by Gofman, Tamplin, of Nuclear workers-Macuso, radium dial painters, Japanese victims, and from these much has been learned. The Draft EIS fails to give adequate attention to this evidence and the evidence related to the effects of radiation damage to the unborn.	The National Academy of Sciences BEIR III Report (reference: "The Effects on Populations of Exposures to Low Levels of Ionizing Radiation: 1980," National Academy of Sciences, 1980) took into account the studies listed in this comment. The NAS Report was used as the basis for calculating the health effects of operation of L-Reactor and associated support facilities. Also see the response to comment EM-15 in this appendix.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

STATEMENT OF S. JACOB SCHERR

Natural Resources Defense Council, Inc.
1725 I Street, N.W.
Suite 600
Washington, D.C. 20006
(202) 223-8210

November 14, 1983

Mr. M. J. Sires, III
Assistant Manager for Health,
Safety, and Environment
U.S. Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29801

Dear Mr. Sires:

Comments on the Draft Environmental
Impact Statement on L-Reactor Operation

I am writing on behalf of the Natural Resources Defense Council, Energy Research Foundation, The Georgia Conservancy, Coastal Citizens for Clean Energy, Environmental Policy Institute, S. David Stoney, Justin Stephens McMillan, and Judith Gordon to provide our comments on the Draft Environmental Impact Statement on L-Reactor Operation, Savannah River Plant, Aiken, S.C. (DOE/EIS-0108D) (September 1983) ("the Draft EIS").

The above-named organizations and individuals are plaintiffs in the case of NRDC et al. v. Vaughan, C.A. No. 82-3173 (D.C.C., July 15, 1983) which ordered the Department of Energy ("DOE") to prepare an EIS on the L-Reactor "as soon as practicable." A number of the plaintiffs have already submitted their own comments on the Draft EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EN-1	The Draft EIS appears to be a half-hearted attempt to rationalize and justify a decision already made to start up the L-Reactor as soon as possible without implementation of improved safety or environmental safeguards. The Draft EIS fails to provide a convincing case for the early start up of the L-Reactor, to disclose fully the impacts of its operation, or to provide meaningful consideration to all reasonable alternatives. Our specific comments on the Draft EIS are as follows: A. <u>Need for the L-Reactor</u>	The Draft EIS was prepared based on the substantive comments that were received during the public scoping process, including the comments of NRDC. The purpose of the EIS is to evaluate the environmental consequences of the restart of L-Reactor. This EIS together with other studies on need will be used by the Department to prepare its Record of Decision. The restart of L-Reactor in this final EIS is based on the need for defense nuclear materials as defined in the FY 1984-1989 NWSM. The restart of L-Reactor as soon as practicable is not considered to be an "early" restart.
EN-2	The failure of the Draft EIS to provide an adequate justification (Section 1) for the immediate startup of the L-Reactor has already been discussed at length in the statement of Dr. Thomas B. Cochran submitted at a DOE hearing on the Draft EIS in Beaufort, S.C. on November 3, 1983. A copy of Dr. Cochran's statement is attached. It is important to emphasize once again that the issue of the need for the L-Reactor is linked directly to the question of whether DOE can implement measures to avoid or reduce environmental harm prior to the proposed operation of the L-Reactor. We would like to make the following additional specific comments:	Responses have been developed for the specific comments contained in this statement. Responses to the statement submitted by Dr. Cochran on November 3, 1983, are contained in this appendix under the letter designation "BL." The need for defense nuclear material is discussed in Chapters 1 and 2 in as great a detail as classification regulations will allow. A classified Appendix available to the decisionmaker, contains a discussion of the need and production alternatives and will be considered in the final decisionmaking.
EN-3	1. The Draft EIS discussion of need relies heavily upon the requirements set forth in the Nuclear Weapons Stockpile Memorandum ("NWSM"), in particular on a declassified quote from the FY 1983-1988 NWSM which states that "...DOE shall... (b) restart the L-Reactor at the Savannah River Plant, Aiken, South Carolina, as soon as possible, but no later than October 1983." The Draft EIS should indicate precisely when the FY 1983-1988 NWSM was approved by the President and whether DOE recommended	As indicated in Section 1.1.1 of the EIS, the FY 1983-1988 NWSM was approved by the President on November 18, 1982. The indicated statement was first proposed by DOE on October 19, 1982, as a means of communicating the urgency of restarting L-Reactor. The quantitative analyses of nuclear material supply and demand in the NWSM fully support this statement and the statements in Section 1.1.2 of the EIS indicating that any delays in the implemented and proposed initiatives, including

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	the above-quoted language. We are concerned that it was added following the start of the controversy in August 1982 over the operation of the L-Reactor and may have been viewed as a means of shielding DOE from criticism.	the restart of L-Reactor, will directly affect the needed supply of defense nuclear materials for our nation's nuclear force structure.
EN-4	Since it appears that at least a portion of the FY 1983-1988 NWSM could be declassified and published, DOE should review both this document, the FY 1981-1983 NWSM and the classified Appendix A to the DEIS to determine whether other segregable portions could be released in order to allow a more meaningful evaluation of DOE's justification for the startup of the L-Reactor. In any event, the following questions must be answered publicly:	Information on weapon builds, stockpile, retirements, and on plutonium and tritium supply, demand, production, and stockpile are classified and, by law, cannot be divulged. No portions of the FY 1981-1983 NWSM, FY 1983-1988 NWSM, or 1984-1989 NWSM containing substantive information pertinent to the need and timing for the restart of L-Reactor can be declassified. All substantive unclassified information in Appendix A to the EIS has been included in Chapters 1 and 2.
EN-5	a. Has not DOE's plutonium equivalent production rate exceeded the previously planned (as authorized in the FY 1981-83 NWSM) rate? b. Has not the delay in the production of enhanced radiation 155 mm AFAP, the reduction or deferment in the production of ALCM warheads and the reduction of MX warheads lowered the plutonium equivalent requirements set forth in the FY 1983-88 NWSM relative to the needs projected in 1980, at the time the decision was made to restart the L-Reactor? c. The DEIS states that "the increased defense nuclear material requirements and production initiatives...have been reaffirmed in subsequent stockpile memoranda (1-2)." Thus, if the answer to either question a. or b. above is "yes," it follows that any reaffirmation of production initiatives in subsequent NWSM's must reflect a desire or intention by DOE to build a plutonium surplus, perhaps on the order of several tons. Is this the case?	The development of each NWSM is based on a detailed analysis of scheduled and planned new weapons systems, scheduled and planned weapons retirements, the current status of material inventory, material supply from retirements, production and processing plans, and capability. This analysis uses data consistent with the current status of legislative actions and administration plans concerning weapons systems and material production. This information, including statements concerning production rates, projected material shortages, or adverse impacts on weapon system deployment, is classified and, by law, cannot be divulged. Changes in weapon builds and schedules cannot be considered independently of changes in weapon requirements and the status of defense nuclear material inventories and production and processing capabilities. Each NWSM provides the results of a detailed analysis of all these factors based on the information available when the NWSM was developed; therefore, changes in the status and plans for production and deployment of weapons are fully accounted for from one NWSM to the next. As indicated in Section 1.1.1 of this EIS, the FY 1984-1989 NWSM considers the fact that Congress has delayed or failed to fund certain nuclear weapons systems.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	d. Is not the desire for a stockpile, rather than projected shortages in meeting weapons requirements, the actual basis for DOE's desire to startup the L-Reactor in January 1984? Discuss in detail the national security reasons for such a large stockpile. Is the stockpile simply a means to justify the early startup of the L-Reactor when it is clear from public statements that warhead requirements have been reduced? e. If the L-Reactor startup were delayed three years, would the effect be simply to draw down the projected plutonium surplus by some 1.5 MT, or to defer the date when the desired surplus level is obtained? f. How long could L-Reactor startup be deferred and the plutonium foregone made up through alternative production initiatives without slippage of the date the desired surplus is presently projected to be achieved?	Although these changes have affected the required delivery of defense nuclear materials, they do not significantly change short- and intermediate-term requirements that L-Reactor must help satisfy. Therefore, all the implemented and proposed initiatives, including L-Reactor restart, are needed as soon as practicable to meet the increased nuclear material requirements. Also see the response to comment BL-15 regarding the analysis of effects of delayed L-Reactor restart.
EN-6	g. Is not there sufficient flexibility in the rate of retirement of obsolete weapons to meet future contingencies should the L-Reactor be delayed and additional plutonium be required?	See the response to comment AB-8 regarding the availability of material from retired weapons.
EN-7	2. The Draft EIS fails to mention the results of the review last year of the White House Science Board, chaired by Dr. Sol Buchsbaum, on the need for new tritium/plutonium production. What were the conclusions of this review? Did the review conclude that a New Production Reactor ("NPR") could not be justified on the basis of tritium/plutonium needs at this time, but that the concentration of all production at the Savannah River Plant (SRP) was undesirable from a national security standpoint? What are the implications of this review for the need for the L-Reactor?	Although the DOE is not in receipt of a report containing the results of the review conducted by the White House Office of Science and Technology Policy, the Department understands that the review supported proceeding on a timely basis with the new production reactor (NPR) and that, for reasons of national security, a site other than Savannah River was recommended for the NPR. The Department is not aware of any recommendations arising from this review concerning L-Reactor.
EN-8	3. The EIS should take into account events and findings since the publication of the Draft which have direct bearing on the question of the need for the plutonium to be produced by the L-Reactor. In late October 1983, the Senate cut further	See the response to comment DI-2 regarding the supply of fuel-grade plutonium to CRBR.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	funding for the construction of the Clinch River Breeder Reactor (CRBR) and DOE has now apparently begun to terminate the project. The decision not to build the CRBR will reduce significantly the demand for DOE fuel-grade plutonium, which may then be available for blending or enrichment to weapons grade.	
EN-9	Secondly, scientific studies presented at the Conference on the Long-Term Worldwide Biological Consequences of Nuclear War, October 31 - November 1, 1983, found that even a limited exchange of nuclear weapons or first strike (100 to 1000 MT) may result in severe climatic changes with profound effects on human health, agriculture, and other aspects of the global environment.	The national policy on weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.
EN-10	4. The EIS should make clearer the fact that NWSM is not a static document, but rather that it is subject to revision and updating. Indeed, the EIS should indicate that the NWSM is now under review and that DOE is free to make recommendations as to changes which might result from this NEPA review of the L-Reactor.	The FY 1984-1989 NWSM approved by the President with the authorization and appropriation of funds by the Congress, serves as the basis for DOE production of weapons and materials. As indicated in Section 1.1.2 of the EIS, any delays in the implementation of the proposed initiatives, including the restart of L-Reactor, will directly affect the needed supply of defense nuclear materials for our nation's nuclear force structure. Also, see the response to comment EN-5.
	<u>B. Thermal Discharges and Cooling Water Alternatives</u> 1. <u>Thermal Discharges (Section 4.1.1.4)</u>	
EN-11	Because it is based on incorrect interpretations of law and inadequate information, this section on the predicted effects of the cooling water discharges on the environment, particularly with reference to South Carolina Water Quality Standards, is extremely difficult to assess. The entire discussion is apparently based on the incorrect and outdated interpretation of these Standards previously applied by the U.S. Environmental Protection Agency, reflected in the NPDES permit issued by EPA in October 1976. Under this interpretation, the Standards apply to the Savannah River, but not to Steel Creek or the other tributaries of the Savannah River within the boundaries of SRP.	The discussion in Section 4.1.1.4 of the Draft EIS for direct discharge was based on the draft NPDES permit received from SCDHEC in August 1982 which proposed thermal limitations as described in Section 4.1.1.4 of the Draft EIS, in the Savannah River. Subsequent drafts of the NPDES permit changed the compliance point from the Savannah River to the discharge point in Steel Creek. On December 15, 1983, SCDHEC announced its determination to issue an NPDES permit to the DOE for the Savannah River Plant effective January 1, 1984. Based on this permit and a mutually agreed upon Consent Order, all discharges except the thermal discharge from L-Reactor would be permitted under the terms of

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	The South Carolina Department of Health and Environmental Control (DHEC), which now has NPDES permitting authority, has made it clear that it considers Steel Creek (into which DOE proposes to discharge wastewaters from the L-Reactor) to be part of the "waters of the United States" as defined by the Clean Water Act. Consequently, the water quality standards of the State of South Carolina apply to Steel Creek as well as the Savannah River. DOE was aware of this new interpretation of the law at the time that the Draft EIS was written, yet the analysis of thermal impacts in the Draft EIS is based on the old interpretation of the standards.^{1/}	the NPDES permit. The thermal discharge from the three operating SRP reactors (C, K, and P) would be permitted provided that DOE would: (1) complete a comprehensive study of the thermal effects of all operations at SRP; (2) complete and submit thermal mitigation studies to SCDHEC within 9 months of the signing of the Consent Order; (3) implement the recommended thermal mitigation alternative approved by SCDHEC under a schedule to be established by SCDHEC in a subsequent Order; and (4) submit and actively support funding requests to accomplish any actions resulting from the thermal studies.
		Section 4.4.2 of the EIS, which discusses cooling-water mitigation alternatives, has been revised based on public comments received on the draft EIS. Specifically, Section 4.4.2 has been revised to provide a detailed discussion of additional combinations of various cooling-water systems. In Section 4.4.2, each of the cooling-water mitigation systems is evaluated for attaining the thermal discharge limits of the State of South Carolina. Section 4.4.2 and a revised Appendix I, Floodplain/Wetland Assessment, discuss the wetland impacts of each of the systems considered.
	^{1/} The "Environmental Information Document, L-Reactor Reactivation, Supplement Number 1, DPST-83-470 (July 1983) prepared by DuPont for DOE states, at 7-5, that: SCDHEC thereby considers SRP onsite streams and ponds as Class B waters of the State. DOE's request for a reclassification of SRP onsite streams was rejected by DHEC prior to the publication of the Draft EIS.	The Department of Energy has been reviewing and evaluating alternative cooling-water systems for L-Reactor. Based on these reviews and evaluations, and consultations with representatives of the State of South Carolina regarding a mutually agreed upon compliance approach, a preferred cooling-water mitigation alternative is identified in this EIS. This preferred cooling-water alternative is to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in the lake. The Record of Decision prepared by the Department on this EIS will state the cooling-water mitigation measures that will be taken which will allow L-Reactor operation to be in compliance with the conditions of an NPDES permit to be issued by the State of South Carolina.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EN-12	By ignoring the current interpretation of the water quality standards, upon which the limits in the draft NPDES permit issued by DHEC months before the Draft EIS was published were based, the Draft EIS has failed to present a relevant or meaningful analysis of the impacts of the cooling water alternative favored by DOE--direct discharge into Steel Creek without any treatment for cooling, or any of the alternatives to this approach.	See the response to comment EN-11.
EN-13	The Draft EIS (at 4-8) notes that the temperature at the end of the effluent canal would at times reach 80°C, but does not note that this greatly exceeds the water quality standard of 32.2°C for Steel Creek, into which the cooling water would be discharged. It also fails to note that the draft NPDES permit issued by the State of South Carolina sets a limit of 32.2°C on the temperature of the cooling water effluent from the L-Reactor, based on the water quality standards.	See the response to comment EN-11.
EN-14	The State set the discharge limit equal to the water quality standard because when the L-Reactor is operating its cooling water discharge would make up over 90% of the flow of Steel Creek. The flows in Steel Creek under natural conditions are given on page 3-22, but should be repeated on page 4-8 so the comparison of the natural flow of around 1 cubic meter/second could be compared with the cooling water flow of 11 m ³ /sec.	Section 4.1.1.4 of the EIS has been revised to reflect this comment.
EN-15	The Draft EIS also does not point out that the temperature at the point where Steel Creek enters the swamp--40°C during a typical spring and 45°C in the severe parts of summer--would also exceed the applicable water quality standard of 32.2°C. Table 4-3 also indicates that DOE predicts that during extreme summer conditions the temperature at the mouth of Steel Creek at the Savannah River would be just under 34°C, but fails to mention the fact this still exceeds the water quality standard.	Table 4-3 of the Draft EIS presents the predicted water temperatures of Steel Creek in spring and summer as a result of direct discharge of cooling water from L-Reactor operation, including the temperature data given in this comment. Also see the response to comment EN-11.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EN-16	The Draft EIS states (at 4-10), "Because the water temperature at the confluence of Steel Creek and the Savannah River is estimated to be only slightly higher than that typical of southeastern warm-water streams, no significant impact on riverine vegetation is expected." Yet, Figure 3-7 (at 3-21) indicates that temperatures in the Savannah River in the spring average between 15°C and 20°C. Table 4-3 indicates that typical spring temperatures at the mouth of Steel Creek would be 29°C. In addition, Figure 3-7 (at 3-20) shows that monthly average daily-maximum temperatures at Ellenton Landing on the Savannah River upstream from SRP are around 21°C to 23°C from June through September, while Table 4-3 indicates that the temperature at the mouth of Steel Creek during the most severe 5-day summer conditions would be 34°C. Both of these sets of data indicate that temperatures at the mouth of Steel Creek will frequently be 10°C higher than the background temperature in the Savannah River. Perhaps the Savannah River is not typical of southeastern warm-water streams. If so, this fact should be noted, as should the very substantial difference in temperature between the waters of Steel Creek at its mouth (during L-Reactor operation) and the waters of the Savannah River upstream from SRP.	During the warmer months the average creek-to-river delta-T is about 7.2°C, with both K- and L-Reactors operating. Persistence analyses, indicate that on the average 10 events per year can be expected with delta-Ts equal to or greater than 11.1°C; the length of these events can be expected to average about 2.5 days. Riverine vegetation in the vicinity of the mouth of Steel Creek consists primarily of bottomland hardwood forests; emergent and submergent macrophytes are sparse or absent. It is improbable that temperatures as high as 11° above ambient for short periods of time would impact these flora.
EN-17	The Draft EIS lists the thermal effluent criteria contained in the NPDES permit written by EPA in 1976 (at 4-12). But, as mentioned previously, by the time of the preparation of the Draft EIS, a draft revised NPDES permit had been issued by DHEC. The draft revised permit contained very different thermal limits. Since the far more stringent limits in the permit prepared by DHEC are likely to be the ones applicable to the L-Reactor if it is started up, these should be the focus of the Draft EIS's discussion of thermal discharges, not the limits in the old EPA-written permit. At the very least, the Draft EIS should contain analyses based on the proposed new permit limits as well as those in the EPA-prepared permit.	See the response to comment EN-11.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EN-18	The listing of the thermal effluent criteria used in the old EPA-prepared permits is incomplete. These criteria, actually the water quality standards applicable to the Savannah River if Steel Creek is considered a 7-mile-long discharge ditch, also include a downstream limit on the mixing zone of 100 yards below the mouth of Steel Creek. (There is reference to how the cross-sectional and surface area limitations on the mixing zone apply within 91 meters of the mouth of Steel Creek, but the permit specifies that the length of the mixing zone is 100 yards (91 meters).) The analyses of the effects of the L-Reactor discharge on attainment of water quality standards in the Savannah River is not only deficient because it is based on an outdated interpretation of those standards but also inadequate because it fails to consider an important component of those standards. This is particularly disturbing since the Draft EIS states (at 4-12) that "the thermal plume from Steel Creek (would become) completely mixed with (Savannah) River water about 1.5 miles downstream." This indicates that reactivation of the L-Reactor would result in failure to meet even the no longer applicable, less stringent interpretation of state water quality standards applied to the SRP discharges in the past. Data and information presented in the Draft EIS suggest that not only will temperatures outside the downstream boundary of the mixing zone exceed the water quality standard, but also the difference between the temperature at the edge of the mixing zone allowed by the state standards (25% of the cross sectional area of the river) and the background temperature of the river would be greater than the 2.8°C allowed by the standards. (Of course, DHEC has ruled that the definition of water quality standards and mixing zones used in the Draft EIS are not appropriate, but it is useful to observe that the L-Reactor would likely cause violations of even this out-of-date, far less stringent interpretation of the standards.) The following information presented in the Draft EIS supports the conclusion that the "delta-T" standard would be exceeded at the cross-sectional boundary of the mixing zone:	As given in the August 1982 draft NPDES Permit, the compliance monitoring point was to be the mouth of Steel Creek with delta-T calculated for daily average on the monthly bases or daily maximum. Modified reactor operation could be implemented to reduce temperature of cooling water if environmental conditions exist that could indicate potential for exceeding the NPDES permit conditions. The delta-T values (8.3°C and 11.1°C) used in the persistence analysis in the Draft EIS were selected because they represent the most limiting criteria for the creek-to-river delta-Ts prescribed in the 6 August 1982 draft NPDES permit. It is noted that these delta-Ts are determined by subtracting the temperature of the Savannah River measured at Ellenton Landing from the temperature recorded at the mouth of Steel Creek. The revised section 4.4.2 provides data for each of the cooling water mitigation alternatives with respect to attaining a discharge to water body temperature difference of 5°F.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	* Figure 4-4 indicates that to meet the water quality standards in the Savannah River at 7010 flow (159 m³/sec), with the L-Reactor and the K-Reactor operating, the delta-T between Steel Creek and the Savannah River at the creek's mouth would have to be equal to or less than 7.8°C. With the river flowing at 170m³/sec, the creek-to-river delta-T would have to be equal to or less than 8.3°C. * Table 4-4 shows that during 1963-1967 a delta-T of 8.3°C or greater at the creek/river boundary occurred as many as 122 days/year. The chart gives an average yearly occurrence over this 5 year period of 107 days, but there appears to be a division error, and the average is actually 86 days/year at 8.3° or higher. During this time there were periods of as long as 23 consecutive days with a creek/river delta-T of 8.3° or greater.	

By considering these two sets of information simultaneously--something not done in the Draft EIS--one can see that delta-T conditions at the mouth of Steel Creek that would cause violations of the state water quality standard of a delta-T at the edge of the mixing zone (25% of the cross sectional area of the river) of 2.8°C or less can be expected to occur as much as one-third of the time during some years and 20% of the time per year on the average. Clearly the Draft EIS's analysis of potential violations of water quality standards in the Savannah River should include a statistical determination of the probability of the Steel Creek/Savannah River delta-T being 8.3°C or greater coincident with flows in the Savannah River being 170 m³/sec or less (violations of the water quality standard are predicted to occur when the creek-to-river delta-T is 8.3°C or more. Such a probability analysis is not included in the Draft EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Although a consideration of the chances of exceedances of violations of the now defunct interpretation of the state's water quality standards is to a large degree a moot point, the above discussion illustrates how inadequate the Draft EIS's discussion of thermal issues is, even if one accepts, for point of discussion, their incorrect, overly lax, definition of what would constitute a violation of state water quality standards.	
	Also, comparison of information presented in Figure 3-6 (at 3-19) and information in Tables 4-4 and 4-5 gives further support to the conclusion that water quality standards violations could occur with significant frequency, even based on the now rejected DOE/EPA interpretation of these standards.	
	No explanation is ever given as to why the delta-T values of 8.3°C and 11.1°C were used as the basis for calculating the frequency and persistence of temperature differences at the edge of the boundary between Steel Creek and the Savannah River. Absence of such an explanation makes it difficult to interpret the information that is presented, leaving one in the position of raising further questions and seeking additional information, as was done above in these comments.	
EN-19	Since DHEC has made it clear that its water quality standards apply to Steel Creek, the Draft EIS should include a discussion of whether the state water quality standard of a delta-T of 2.8°C or less could be met at any point in Steel Creek, if the proposed cooling water discharge alternative is employed.	See the response to comment EN-18 regarding the analysis of cooling-water mitigation alternatives in Section 4.4.2 of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
2. <u>Cooling Water Alternatives</u> (Section 4.4.2)		
EN-20	Overall, this section suffers from the same major flaw as the previously discussed section--failure to acknowledge the State of South Carolina's determination that their water quality standards apply to Steel Creek and the other Savannah River tributaries within the boundaries of the SRP. As a consequence, many of the cooling water alternatives presented in this portion of the Draft EIS are totally irrelevant, because they would involve using Steel Creek as a treatment system for the cooling of the discharges from the L-Reactor. South Carolina's standards are clear in prohibiting the waters of the state for this purpose. This section should be rewritten, excluding all such alternatives and focusing more on alternatives that could meet state water quality standards. The following alternatives clearly would not meet state water quality standards: (1) <u>once-through cooling</u> (the Draft EIS's preferred alternative) This alternative would result in the discharge of cooling water into Steel Creek at a temperature of 79°C, far in excess of the water quality standard of 32.2°C or less; since the cooling water would constitute the vast majority of the flow of Steel Creek when the L-Reactor was operational, the water quality standard and limits on the effluent have to be the same, as reflected in the draft NPDES permit issued by S.C. DHEC. Consequently both the water quality standard and the proposed NPDES permit limit would be violated by this option.	See the response to comment EN-11 regarding cooling-water mitigation alternatives.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
(2)	<u>once-through spray canal system</u>	This results in discharges into Steel Creek of 75°C during the summer months, exceeding water quality standards and the proposed permit limit by more than a factor of two.
(3)	<u>once-through impoundments on Steel Creek</u>	Both the alternatives presented under this heading are unacceptable and illegal because they involve turning large parts of Steel Creek into cooling reservoirs. Neither the small rubble dam or the single impoundment option are acceptable or worthy of discussion.
(4)	<u>diversion to Pen Branch</u>	This would result in discharges to this stream at temperatures of 70°C, which would clearly cause violations of the 32.2°C maximum temperature water quality standard.
(5)	<u>500-acre lake with spray cooling</u>	Though the water coming out of the spray cooling system would be at 32°C, this option involves discharging once-through cooling water at a temperature of 75°C into an impoundment built on Steel Creek. Once again, Steel Creek would be used as a cooling water facility and water quality standards would be violated most of the time.
(6)	<u>several small dams plus spray cooling</u>	Same problems as the previous option.
(7)	<u>recirculation through creation of L-Pond</u>	This option is unacceptable and illegal because it involves the damming of Steel Creek and use of the resulting reservoir as a cooling pond.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	(8) <u>recirculation through creation of Kal Pond</u>	Unacceptable and illegal for the same reason as the L-Pond option.
	(9) <u>recirculation through creation of High-Level Pond</u>	Unacceptable and illegal because it involves damming Pen Branch to form a cooling pond.
	(10) <u>low-head hydropower</u>	Unacceptable and illegal for same reasons as for all the other alternatives that involve impounding natural streams to create ponds to be used to cool water.
	Based on the information provided in the Draft EIS, it appears that the following alternatives might meet water quality standards, but more information needs to be presented to make a meaningful assessment possible:	
	(1) <u>mechanical draft cooling towers with complete recirculation</u>	This would result, according to the Draft EIS, in a discharge to Steel Creek at a maximum of 34°C, much closer to the water quality standard and draft NPDES permit limit of 32.2°C; furthermore, the volume of the discharge would be much less than with any of the previous alternatives, although the Draft EIS fails to present any figures on the expected volumes and frequencies of discharges. This option might meet the water quality standards, at least for much of this option is needed, including how frequently, if ever, water quality standards would be violated.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	(2) <u>mechanical draft cooling towers with partial recirculation</u>	The Draft EIS states that cooling water would be discharged into Steel Creek at "near ambient" temperatures, but never gives the exact figures needed to compare this alternative to the others presented; because the amount of wastewater discharged would be much higher most of the time than with cooling towers with complete recirculation, the exact temperature of the discharged cooling water must be known in order to determine if water quality standards would be violated.
	(3) <u>once-through mechanical draft cooling towers with discharge to the mouth of Steel Creek via a canal/pipeline system</u>	Once again, the Draft EIS states that the discharges of cooling water would be discharged at "near ambient" temperatures without specifying the exact temperatures expected; this alternative might result in compliance with water quality standards most or all of the time, but it is impossible to tell based on the information presented in the Draft EIS. The following options presented in the Draft EIS appear to have some potential for meeting water quality standards when combined with other cooling operations such as cooling towers and spray systems; however, further study and additional information are needed in order to perform a meaningful analysis of these options: (1) <u>thermal cogeneration</u> Operating alone, this option would not achieve the 30°C to 40°C temperature decrease needed to meet water quality standards (the Draft EIS says the effluent would be cooled 11°C to 17°C), but perhaps in

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	combination with cooling towers or spray systems this option, which has the benefit of recovering some of the waste heat energy from the reactor, might prove sufficient. (2) <u>modified reactor operation</u> Though use of this option cannot alone reduce the temperature or flow of the discharge sufficiently to result in achievement of water quality standards, it might if employed in conjunction with other systems; unfortunately, the Draft EIS fails to provide any meaningful data on these kinds of options, but simply states that "evaluation of these combined alternatives is part of the current comprehensive cooling water study being conducted on SRP thermal discharges."	
EN-21	The discussion in the Draft EIS of cooling water alternatives is also flawed as a result of superficiality and incompleteness of the cost and schedule comparison of the various alternatives (4-122). Neither the Draft EIS nor the underlying Environmental Information Document ("EID") prepared by DuPont provide any discussion of how these estimates were derived. Indeed, there are some inconsistencies among the figures provided in the Draft EIS, the EID, and the NUS presentation "Comparison and Evaluation of Alternative Cooling Systems (undated)." Without full information on the assumptions and methods employed to develop these estimates, it is impossible to assess their validity.	The costs and schedules presented in the EIS reflect the latest engineering estimates of required earth and civil work, rerouting services, and equipment requirements (pipes, valves, pumps, etc.). All information on cost and schedule are either taken from the referenced documents or reflect the best judgment of the experts in preparing this EIS.
EN-22	Finally, the Draft EIS provides no data at all on the socioeconomic effects of the adoption of various alternatives. The Final EIS must include an estimate of the number of jobs which would be created and effect upon the local economy of each of the acceptable alternatives.	Section 4.4.2 of this final EIS has been modified to include an estimate of the number of construction personnel required for each alternative. The potential economic effects on the local economy due to implementation are considered to be small in relation to the restart of L-Reactor and current construction programs at the SRP. Due to the relatively short period of construction required both indirect and induced economic impacts are also expected to be small.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>C. Groundwater Impacts</u>		
The deficiencies in the discussion on groundwater impacts of L-Reactor operation are detailed in the attached analysis by Professor Yaron M. Sternberg of the University of Maryland. Professor Sternberg points out that:		
EN-23	1. The Draft EIS is seriously flawed in the lack of hydrogeological data for the immediate vicinity of the L-Reactor and its reliance, without proper justification, upon data for the F and H areas, which are some 10 km away.	Details on the hydrostratigraphy of L-Area (developed from several source including soil borings and drill logs and geophysical well logs) are presented in the EIS. Specifically this topic is discussed in Section F.2.10 which includes three cross-sections and a depth-to-ground-water map for L-Area and vicinity. The elevation of the ground-water table is mapped in Section 3.4.2.2. Pumping test data for the new Tuscaloosa wells in L-Area was used to assess drawdowns in the Tuscaloosa beneath L-Area (Section 4.1.1.3). L-Area water quality data are described in Section F.5.2. This information, together with our understanding of the hydrogeological conditions of the F- and H-Areas, provided sufficient justification for the assessment of potential L-Reactor impacts on the groundwater.
EN-24	2. The Draft EIS suggests that it is not likely that pollutants in the L-Reactor area would contaminate the Tuscaloosa aquifer because the hydraulic head of this aquifer at this location is higher than that in the Congaree Formation. However, no data is presented on (1) what data was used to locate head reversals between these two areas and (2) what are the future anticipated head differences in view of the continuous decrease of the piezometric head in the Tuscaloosa Formation and increases in pumping rates on and off site. The consequences of possible head reversal in the L-Reactor area must be evaluated.	See the responses to comments AJ-1, AW-1, BT-7, and EL-15. The discussions on the effects of increased pumping on the head differential between the Tuscaloosa and Congaree Aquifers given in Sections 4.1.1.3, 4.1.2, 5.1.1.2, 5.1.1.4, and 5.2.3 have been expanded. Based on Figures F-9 and F-18, Figure F-29 has been revised to depict the head difference between the Tuscaloosa and Congaree Formations. In A- and M-Areas, where the green clay is discontinuous, the cones of depression in wells producing from the Tuscaloosa are not reflected in water levels in the shallow aquifers. This fact and data related to the contamination of the shallow ground water with chlorinated hydrocarbons shows that the basal clay of the Congaree and the upper clay of the Ellenon are effective confining units for the underlying Tuscaloosa sands throughout the SRP, including L-Area. The ground water in the Tuscaloosa and Congaree beneath L-Area flows to the Savannah River. The public risk from the potential migration of contaminants, which might migrate into formations underlying the

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		McBean Formation from the L-Area seepage basin, are considerably reduced by this flow path, the protracted travel time, and dispersion.
EN-25	3. The startup of the L-Reactor would add waste discharges in the F, H, and M areas and thereby contribute to future contamination and aggravation of the already acknowledged groundwater problem at SRP. These areas should not receive additional wastes, and "seepage basins should not be used anywhere at the SRP for disposal of any hazardous material because such activity poses a potential serious health hazard to users of groundwater."	See the responses to comments DA-2 through DA-8.
	<u>D. Safety of the L-Reactor and Alternatives</u>	
EN-26	As discussed at length in the attached statement of Dr. Cochran, the EIS should state that the L-Reactor as presently designed does not meet the same basic safety criteria which are applied to commercial nuclear reactors. Dr. Cochran further points out that the analysis on the Draft EIS of safety improvements is seriously flawed. We would like to add the following comments on L-Reactor safety and alternatives.	L-Reactor does meet the pertinent basic safety criteria that is applied to commercial nuclear reactors. See the responses to comments BL-1 through BL-14.
EN-27	1. The Draft EIS fails to provide the required "worst case" analysis of the possible consequences of a major nuclear accident at the L-Reactor. ^{2/} The Draft EIS examines the consequences of only a 10% meltdown of the reactor's core with the active confinement system operating as designed. It is clear that greater meltdowns and active confinement system	Analysis of a full core meltdown is not required to test compliance with 10 CFR 100. See the responses to comments BL-1 and BL-4. To provide a further perspective on the overall accident risk (defined as consequence times probability) of L-Reactor operation, the EIS contains in Section 4.2.1.6 and Appendix G a preliminary total risk curve that depicts the annual probability of an individual living at the SRP site boundary receiving more than a certain dose from postulated severe accidents. The results shown in this curve were based on the Safety Analysis Report, and include high probability low consequence accidents to low probability high consequence accidents including the hypothetical 100-percent core melts at the upper bound of the consequence spectrum.
	^{2/} EIS's must include "worst case" scenarios where there is a lack of scientific certainty. The Nuclear Regulatory Commission ("NRC") has recognized the technical difficulties in predicting both the probabilities and consequences of nuclear accidents in the wake of the Three Mile Island nuclear accident--an accident which was viewed as "incredible" before it happened.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	failures could physically occur. Since a full core meltdown with active confinement failure is a possibility, no matter how slight, DOE is obliged to present the analysis in its EIS. Also, as noted in the attached statement of Dr. Cochran, an analysis of a full core meltdown is also required to test compliance with 10 CFR 100 standards.	The Department of Energy recognizes uncertainties inherent in the prediction and consequences of extremely low-probability but high-consequence accidents. The worst-case analysis required by NEPA is intended to provide the decisionmaker with information to balance the need for the action against the risk and severity of possible adverse impacts if the action proceeded in the face of uncertainty. The "uncertainty" in this instance, however, is not one that questions the severity of the consequences if this class of accident were to occur, but rather the degree of improbability of its occurrence (i.e., whether once in 10 million years or once in a billion or more years). The detailed analyses of the very-low-probability, 10-percent, core-melt accident, together with available information on the consequences and probabilities of a spectrum of more severe but even less probable accidents included in the EIS are judged to provide the decisionmaker with sufficient information for this purpose.
M-404	EN-28 DOE's failure to present data on the consequences of a full core meltdown is rather puzzling since its contractor, NUS Corporation, performed such a computer analysis in August 1983, prior to the issuance of the Draft EIS. The section of the Draft EIS on accident consequences must be totally rewritten to include full consideration of the most severe accidents involving a full core meltdown and failure of the active confinement system.	The NUS analysis of a full core meltdown using the CRAC2 code was done to assure that the consequences predicted were not different in kind from those for the 10-percent core-melt case; that is for example, no prompt fatalities in either the 10-percent or the 100-percent core-melt case. Since that was the case, the health effects predictions are directly scalable (i.e., the 100-percent core-melt consequences are 10 times those of the 10-percent core melt) and the decision was made to include only the results of 10-percent core-melt analysis in the EIS as representative of an accident whose consequences are "not exceeded by those from any accident considered credible" (10 CFR 100.1 (a)).
	EN-29 2. The Probabilistic Risk Assessment ("PRA") for the L-Reactor (DPST-83-717) appears to exclude external events, including earthquakes, hurricanes, and tornadoes. The failure to consider such events in the PRA makes the use of the PRA results in the Draft EIS extremely questionable. a. Earthquakes beyond the design basis should be evaluated as an accident initiator using PRA for the L-Reactor since the general area in which the site is situated includes the Charleston area affected by the great 1886 earthquake and falls in a large region subject to earthquakes of about Mercalli Intensity VII (DPSTSA-100-1, Rev. 12/81, at 2-16 and Figure 2-8, at 2-17). The recent	As noted in Section 4.2.2.3 a design-basis earthquake of 20 percent of gravity with a return period of 5000 years has been established for the Savannah River Plant and improvements have been made to the reactors to meet the seismic criteria of the design-basis earthquake. A panel of eight experts in the earthquake sciences, led by George W. Housner, all concurred with 20 percent of gravity ground motion as being a conservative design basis. In a similar study the Tera Corporation (1982; "Seismic Hazard Analysis for the Savannah River Plant, South Carolina") concluded that the best estimate of the return period for 20 percent of gravity ground motion was 5800 years, which is in good agreement with the information presented in Section 4.2.2.3.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
M-405	publications of Algermission et al., should be consulted for probability statistics for ground acceleration values, as well as the recent USGS and NRC reports (the NRC report was in the form of a SECY paper and a Board Notification) concerning the Charleston earthquake. These reports indicated that such a quake could occur anywhere along the East Coast and the 1886 quake was not associated with any known tectonic features. A probability of exceeding the design basis earthquake of one in 5000 years is too high if such an earthquake could lead to a full core meltdown.	The responses of reactor structures and equipment to ground accelerations greater than 0.20g have not been explicitly analyzed. Such accelerations cannot be ruled out as possibilities in seismic events with return periods in excess of 5000 years. However, the 0.20g is not a threshold beyond which extensive failures of industrial facilities designed to conservative engineering codes and standards, as are SRP reactor systems, with no explicit seismic design consideration, indicates such facilities can be expected to survive accelerations well in excess of 0.20g without experiencing important failures or significant damage. This is, in particular, true of welded piping systems, which have proven to be nearly invulnerable to ground accelerations up to 0.5g and beyond.
	b. Hurricanes should be evaluated as an accident initiator since hurricanes affect South Carolina about every seven years and hurricane force winds have been measured at the site during the passage of Hurricane Gracie to the north of SRP in 1959. There were 38 historical hurricanes affecting South Carolina between 1700 and 1971; and there may have been others since 1971 (DPSTSA-100-1, Rev. 12/81, at 2-9 to 2-10).	As noted in Section 4.2.2.4, the SRP reactor blast resistant design criteria offers protection to tornadoes and hurricanes. The reactor building itself can withstand a tornado-induced pressure drop that is twice the pressure drop associated with a tornado which has a 2.61×10^{-6} probability of occurrence (Section 4.2.2.4). Attachments to the reactor building such as the 61-meter-tall stack and the confinement system filter compartments are not as resistant to tornadoes. However, damage to such attachments will not cause a reactor accident. Damage to such attachments immediately following an independently caused reactor accident would increase offsite dose effects; however, the probability of independent occurrence of an accident followed by a severe tornado or hurricane is so low that it need not be considered.
	c. Tornadoes should be evaluated as an accident initiator using PRA for the L-Reactor; tornadoes striking a specific point within the SRP site have an estimated recurrence interval of about 1,500 years (DPSTSA-100-1, Rev. 12/81, at 2-10). This recurrence interval is far from trivial in the context of a PRA. In addition, the confinement filter compartments will not withstand a hypothetical design-basis tornado (DPSTSA-100-1, Rev. 12/81, at 3-4).	Also see response to comment BL-12 concerning NRC's position regarding PRA analysis of accident sequences initiated by events more severe than the design bases for natural phenomena.
EN-30	3. The Safety Analysis Report ("SAR") for the SRP reactors discusses the presence of a heavy water plant four miles from one of the reactors (unspecified) from which a "massive release" of hydrogen sulfide gas could occur, and also discusses a chlorine source 100 meters from an SRP reactor (again, unspecified). The SAR argues, however, that safe shut-down could be attained from a remote control station located more than 10 miles away. The EIS should clarify how the remote control station operates and the criteria used to activate it.	Recent changes in plant operation have essentially eliminated hazards in L-Area from hydrogen sulfide and chlorine as noted in Section 4.2.2.1 of the EIS. Section 2.2.2.7 has been revised to provide additional information regarding remote control station operation and activation.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EN-31	4. The SAR quotes an existing probability for SCRAM failure together with failure of backup shutdown system of 6×10^{-5}, but mentions a planned project to reduce the probability of failure of the primary scram systems from 1:1,000 to less than 1:1,000,000 (DPSTSA-100-1, Rev. 12/81, at 4-59). The EIS should specify what the improvements to the scram system consist of and whether they have been implemented. 5. The discussion of the CRAC2 analysis of accident consequences in the Draft EIS (4-56) fails to disclose many important underlying assumptions, including the following:	The proposed project to further reduce the probabilities associated with failure of the primary scram system would increase the redundancy and independence of the scram system at both the channel and system level. It is not necessary that the EIS address this project which would increase the overall system reliability because the analyses conducted in the EIS are based on the probabilities of the systems as currently installed.
EN-32	a. The CRAC2 analysis cites zero early fatalities and zero people with whole body and thyroid doses greater than 25 rem and 300 rem respectively. This is due to the failure to consider the consequences to people on site. The EIS should take into consideration the SRP work force including the consequences under a delayed or no evacuation scenario. Even with evacuation, some of the SRP workers will be required to remain onsite for security reasons.	The CRAC 2 analysis treats on-site personnel as a transient population similar to schools, shopping centers, and factories. This treatment of on-site personnel is consistent with similar CRAC analysis performed in the Reactor Safety Study and consequence assessments of light-water reactors which only consider resident populations.
EN-33	b. The CRAC2 analysis does not report results for the 100% core melt case though, as noted above, DOE's contractor performed such an analysis.	The 100-percent core-melt accident is not considered credible. However, even if a 100-percent core-melt accident is assumed the conclusions given in the EIS are valid. These conclusions are that there will be no early fatalities, no cases where the thyroid dose exceeds 300 rem and no cases where the whole body dose exceeds 25 rem. The mean population whole body dose would be 10 times that given in the EIS for the 10-percent core melt, that is, 7.7×10^{-2} person-rem per reactor year (for the population within 80 km of the reactor site). This whole body dose is negligible in comparison to the effects of natural background radiation of 8×10^3 person-rem per year for this population.
EN-34	c. The conditional probabilities presented, e.g. in Figure 4-11, are wrong because they consider only meteorology and do not consider the probability of confinement system failure and other common cause failure scenarios.	See the responses to comments BL-9 and BL-12.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EN-35	d. The CRAC2 model utilized by the DOE assumes the LD_{50/60} (lethal dose to 50% of the exposed population within 60 days) is 510 rads. This assumption is overly optimistic. This assumes the victims receive "supportive treatment," which includes barrier nursing, copious use of antibiotics, massive transfusions, reverse isolation, and other special sterile procedures. It is far from clear that this can be provided for all those in need in the event of a severe accident at SRP. How, for example, will the victims of the highest exposures be identified when there will be many others who may be suffering symptoms of radiation sickness (such as prodromal vomiting) from lesser exposures. There is considerable controversy over the use of the 510 rads LD_{50/60}. The Risk Assessment Review Group (NUREG)/CR-0040, "Risk Assessment Review Group Report to the U.S. Nuclear Regulatory Commission," Harold W. Lewis, Chairman, September 1978) concluded that scientific opinion supports a range from 400-600 rads. This range could cause a factor of two change either way in the number of early fatalities. Moreover, the Risk Assessment Review Group concluded with regard to supportive treatment that "the ability to carry out such intervention has not only not been demonstrated, but isn't even well planned at this time (NUREG/CR-0040, at 19). Changing the LD_{50/60} from 510 rads for "supportive treatment" to the level of "minimal treatment," i.e., 340 rads, could increase the number of fatalities on the SRP site by a factor of two to four (WASH-1400, Appendix VI, at 13-50; NUREG-0340, at 26-28). Other groups have used more realistic dose-response relationships which are closer to the "minimal treatment" curve used in WASH-1400. The California underground siting study used an LD_{50/60} for minimal treatment of 286 rads and for supportive treatment of 429 rads (Subcommittee on Energy and the Environment, House Committee on Interior and	In CRAC 2 analyses, most early fatalities are predicted to be caused by irradiation of the bone marrow. For this reason, the LD 50/60 doses established in the Reactor Safety Study are based on bone marrow exposures. The CRAC 2 results for the L-Reactor indicate a peak bone marrow dose for a 10-percent core-melt accident is 78.4 rem and this occurs at a distance of 0.5 mile from the plant. At a distance of 5 miles, the peak dose drops to 11.5 rem. Therefore, even under an extremely conservative assumption of 100 rads, the number of early fatalities among the general public would remain unchanged at a value of zero. The general question of whether the Reactor Safety Study (RSS) methods for calculating health effects (both early and latent) should be revised was considered in the PRA Procedures Guide (NUREG/CR-2300, January 1983). After extensive peer review of a draft report, the authors of the section of the Procedures Guide that deals with Environmental Transport and Consequence Modeling came to the follow conclusions: "As this chapter was being written and reviewed, it became apparent that the topics of dosimetry and dose-response relationships generate considerable scientific controversy. After detailed discussion, the authors have decided to make the following recommendations. First, the state-of-the-art has not yet "solidified" to the extent that it is possible to recommend unequivocally a replacement for the RSS methods. Hence, the RSS remains the best comprehensive treatment of dosimetry and dose-response relationships in the context of consequence modeling, and its methods remain acceptable. Second, because considerable work has been done since the publication of the RSS, those who wish to try to update the methods are encouraged to do so. However, those who vary from the RSS values should use sources that have been subjected to a peer review, such as ¹Section 9.3.5.3 of NUREG/CR-2300.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Insular Affairs, "Reactor Safety Study Review," Serial No. 96-3, 1979, at 366, attachment to letter dated 21 February 1979, from Bryce W. Johnson, Peter R. Davis, and Long Lee to Hon. Morris Udall, at D-7. In addition, the "Accident Evaluation Code" (AEC) used to calculate health effects in CRBRP-1 utilizes an LD_{50/60} of 350 rems (SAI-978-78-PA, Z. T. Mendoza and R. L. Ritzman, "Final Report on Comparative Calculations for the AEC and CRAC Risk Assessment Codes," Science Applications, Inc., December 1978, at 3-6 and 3-8).	the BEIR III report (1980), the UNSCEAR (1977) report, and ICRP Publication 26 (1977). Finally, studies intended to update the RSS methods are in progress: the NRC is funding work on age- and sex-specific dose-conversion factors at the Oak Ridge National Laboratory, and work on health-effects modeling is under way at Harvard University's School of Public Health. When their results have been published, a comprehensive updating of the RSS methods in codes like CRAC2 will be in order."
		Since the Procedures Guide was written, the Harvard School of Public Health has published "A Critical Review of the Reactor Safety Study Radiological Health Effects Model" by Douglas W. Cooper et al., NUREG/CR-3185, March 1983.
		This report list many aspects of health effects modeling that need to be investigated. These investigations are under way at the Harvard School of Public Health and are being funded as part of the Nuclear Regulatory Commission's MELCOR project, which has as one of its aims the updating of the CRAC2 consequence modeling code. Meanwhile, the conclusion of the Procedures Guide, that "the RSS remains the best comprehensive treatment of dosimetry and dose-response relationships in the context of consequence modeling and its methods remain acceptable" still stands.
EN-36	e. The CRAC2 code contains several "hidden" assumptions regarding the cancer risk estimator for latent cancers, including an assumption that the cancer risk at low dose is a function of dose rate. The net effect of these assumptions appears to be to reduce the estimate of latent cancer fatalities (exclusive of thyroid cancers) by a factor of about 5 or more compared to the opinion of NRDC and a number of experts, including Radford, Morgan, Gofman, Stewart, Mancuso, Kneale, and Tamplin. Furthermore, DOE should report cancer incidence, rather than cancer fatalities. The cancer incidence risk is 1.5 to 2 times the fatality risk. The old WASH-1400 cancer risk values which DOE relies upon are no longer valid in light of BEIR III as modified by consideration of the recent finding regarding dosimetry at Nagasaki and the latest ABCC mortality data.	The assumption that the cancer risk at low doses is a function of dose rate is also explained in the PRA Procedures Guide, (pp. 9-53 and 9-54): "The estimates of latent cancer calculated by the CRAC code are based on the BEIR I report with leukemia and bone-cancer values modified to reflect new data that became available between 1972 and 1975. The RSS developed three estimates of risk. The upper-bound estimate used the linear, no-threshold estimators from the BEIR I report (1972). The central estimate incorporated a dose-effectiveness factor for exposures delivered at low dose rates. The lower-bound estimate took into account the large uncertainty in estimating effects from low doses and low dose rates and assumed a threshold of 10 or 25 rem for latent-cancer fatalities. The central-estimate approach is consistent with the BEIR III report (NAS-NRC), 1980), which used a linear-quadratic model to calculate risk estimators for

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EN-37	f. As noted above, the CRAC2 accident consequence calculations ignore any possible common cause failure of the confinement systems and the ECCS, e.g., due to external events. Certainly both of these systems are dependent upon offsite and onsite power supplies, and both will fail if all power is lost.	latent-cancer fatalities. In addition, the BEIR III report published ranges that indicate some of the uncertainty associated with these factors. The upper and the lower bounds of the ranges were obtained with the linear model and the pure quadratic model, respectively. The risk estimates, based on the linear-quadratic model, of BEIR III (1980) are approximately 2 times lower than the BEIR I (1972) estimates based on the linear model." In summary, the authors of the EIS believe that the central estimate is consistent with a reasonable concern of expert opinion and should therefore be used in point estimate calculations of the public risk of latent-cancer fatality.
EN-38	6. The discussion of the Draft EIS of alternative safety systems for the L-Reactor (Sec. 4.4.1.6) appears to be premised upon a fundamental misunderstanding of reactor safety philosophy. The EIS erroneously implies that the cost/benefit methodology used in the NRC regulations 10 CFR Appendix I for limiting radiation releases under normal operations is equally appropriate for defining safety requirements for mitigating severe nuclear reactor accidents. However, the NRC regulations do not suggest in any way that such requirements (see 10 CFR 100) can be waived if an analysis "demonstrates" that the containment system has an unfavorable cost/benefit ratio.^{3/} While 3/ DOE must surely recognize the fallacy of this approach since conceptual designs for a New Production Reactor ("NPR") appear to include a passive containment building. See Memorandum from D. E. Hostetler to P. L. Roggenkamp, "Alternatives to L-Reactor Startup: New Production Reactor: Savannah River Laboratory (DPST-83-643, June 29, 1983). In addition to a containment building, the NPR would have a number of other "enhancements" over current SRP reactor design, including cooling towers and D₂O detritiation. A schematic of the NPR at SRP, is attached.	The intent of this calculation was to show the consequences of a beyond design basis accident. No attempt was made to do a PRA that would consider the common-cause failures described. In any application of technology, whether nuclear or not, cost/benefit methodology has always been a factor either implicitly or explicitly. This is particularly true in considering modifications to existing equipment or facilities and is recognized by Federal legislation in a number of areas. For example, air pollution control requirements are different for "new sources" than for existing plants; old automobiles are not required to be modified to meet current emission standards; existing power plants have not been generally required to backfit cooling towers, although new plants at similar locations do employ them. Thus, the feasibility and cost of incorporating a variety of enhancements on a new reactor, which are greatly different than for existing reactors, are justifiable considerations. The identification of the EPA and NRC valuations of person-rem was for the purpose of providing a perspective which DOE regards as important but not determinative in deciding upon the need for and nature of safety system augmentation for the existing reactors. However, in view of the high degree of

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	the NRC has used cost/benefit analysis in its safety goal development program (NUREG-0880 Rev. 1), it has not chosen to use such analysis to replace the current design basis requirements in 10 CFR 100 for containment/confinement systems.^{4/} In sum, this section of the EIS must be totally recast to examine which confinement/containment system alternative meets 10 CFR 100, using the appropriate methodology (95% meteorology and a source term of 100% noble gases, 50% of the halogens and 1% of the solid fission products and plutonium inventory). Only then should the EIS apply cost/benefit analyses to determine which alternative of those that meet 10 CFR 100 is preferred. E. <u>Miscellaneous Comments</u>	Isolation provided by the SRP site (compared to any nuclear power plant site), the engineered safety features of the existing reactors are considered to be entirely in philosophic accord with the spirit of 10 CFR 100.10(d) which suggests that sites may be found acceptable if the site features are complemented "by appropriate and adequate compensating engineering safeguards."
EN-39	The Draft EIS mentions (at 3-31) the criteria which were used over 30 years ago to choose the site for the Savannah River Plant. This is somewhat misleading since it implies without any documentation that these exact same conditions exist today. However, as an example, it is now clear that there are competing uses for "the large cooling water supply" and the SRP's outdated reliance on the Savannah River methods for cooling purposes is a matter of substantial concern.	The siting criteria, which were used to select SRP from among 100 potential locations, are identified as a matter of record. These statements do not imply that conditions have remained unchanged. For example, placing R-Reactor and the Heavy Water Production Facility in standby status and construction of Par Pond have greatly reduced SRP's surface-water requirements. Also, see the responses to comments AB-13 and EN-11.
EN-40	Most of the maps in the Draft EIS (see Figures 3.1, 3.2, 3.4, 5.1) do not make clear, through differences in shading, that there are private lands (i.e., Little Hell's Landing and the Creek Plantation Swamp) which are bounded on three sides by SRP and on the fourth by the Savannah River. The reader may be left with the mistaken impression that DOE has control over this entire area. These maps should be accordingly revised.	Maps depicted in Figures 3.2 and 5.1 clearly indicate the boundary of the Savannah River Plant. Potential impacts on offsite areas such as Little Hell's Landing and Creek Plantation Swamp are specifically described in appropriate sections of the EIS in terms of being privately owned or located offsite (e.g., Section 3.7.2.1--Radfocesium).
	^{4/} Even if DOE were correct in its interpretation of NRC safety requirements, its analysis of safety system alternatives is in error. See attached statement of Dr. Cochran at 14-15.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>Conclusion</u>		
EN-41	For the reasons set forth above, we believe that the Draft EIS does not provide an adequate basis under the National Environmental Policy Act for decisionmakers to determine whether, and if so, under what conditions to proceed with the operation of the L-Reactor. In order for DOE to meet its responsibilities under NEPA and given the grave deficiencies in the Draft EIS, we would strongly urge that a new substantially revised draft environmental impact statement be issued for further public review and comment. Only if such action is taken, can DOE decisionmakers, the Congress, and the public be able to assess the effects of L-Reactor operation and availability of alternatives which would avoid or reduce environmental harm. If you have any questions with regard to these comments, please don't hesitate to contact me. Sincerely yours, S. Jacob Scherr Counsel for Natural Resources Defense Council, Energy Research Foundation, The Georgia Conservancy, S. David Stoney, Jr., Judith E. Gordon, Justin Stephens McMillan, Coastal Citizens for Clean Energy, Environmental Policy	DOE believes that sufficient information is available in the EIS for the public and decisionmakers to assess the environmental impacts of L-Reactor operation. Changes to the Draft EIS were made in this Final EIS and these changes are clearly marked to allow the reviewers to differentiate between the draft EIS and final EIS.
(Note: Dr. Cochran's Statement of November 3, 1983 is contained in this appendix as statement "BL")		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

Comments on the
Draft Environmental Impact Statement
L-Reactor Operation
Savannah River Plant

Prepared for
Energy Research Foundation
Columbia, S.C.

by
Yaron M. Sternberg, Ph.D.
November 14, 1983

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	My name is Yaron M. Sternberg, Ph.D., and I am a professor of Civil Engineering at the University of Maryland, College Park, Maryland. My area of expertise is groundwater hydrology with emphasis on migration of contaminants in groundwater. My professional experience includes a number of hydrogeological investigations of solid waste and hazardous waste sites as well as remedial action feasibility studies. The following comments on the Draft Environmental Impact Statement (EIS) on L-Reactor Operation, Savannah River Plant (SRP) are restricted to groundwater issues and are based on a review of the Draft EIS as well as a number of other publications referenced in the Draft EIS. The primary goal of the review was to assess the evaluation in the Draft EIS of the impact on groundwater quality as a result of the proposed startup of the L-Reactor. Groundwater contamination has already been detected in a number of areas within the SRP boundaries. In particular, serious groundwater quality degradation has occurred in the vicinity of the M-area settling basin and the old TNX basin. Reportedly, groundwater monitoring, mathematical modeling, and pilot operations for remedial action have been conducted in suspected contaminated areas. The Draft EIS contains only limited information on the status of the corrective action taken to protect and/or restore the groundwater quality at SRP.	
EN-42		The SRP ground-water concerns, including M-Area and old TNX basin, will be the subject of a separate NEPA process as noted in Section 6.1.6 of this final EIS. See also the response to comment AJ-1.
EN-43	A serious flaw in the Draft EIS is the lack of hydrogeological data for the immediate vicinity of the L-Reactor. In contrast, the F and H areas have been the subjects of intensive hydrogeological studies. The stratigraphy of the aquifers present at those locations as well as the piezometric head data in the various geological units are available. Areas F and H are approximately 10 km north of the L-Reactor area. The Draft EIS suggests that the geological and hydrogeological conditions at the L-Reactor site are similar to those in the F and H areas. However, there are no data to substantiate this claim. The closest piezometer screened in the Tuscaloosa formation is about 7.5 km east of the L-Reactor (P54) and apparently there are no piezometers in the Congaree formation. Water table contours in the vicinity of the L-Reactor area, given in Figure F-24, are based on a 1973 report; apparently, more recent data	See the response to comment EN-23.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	are not available. The conclusion that can be drawn based on the data presented is that only sparse data are available for the L-Reactor area. The Final EIS must include sufficient data to delineate in detail the geology and, the groundwater regime at the site and should explain variations, if any, between previous and present groundwater conditions.	
EN-44	The Draft EIS relies to a large extent on data presented by Siple (1967). In particular, seepage velocities computed for each of the major stratigraphic units are based on limited hydraulic conductivity and gradients data, and assumed effective porosities. The velocity values are used to compute radioactive decay rates, and travel time of groundwater to discharge points in surface streams. Groundwater velocities are rarely constant in time or space and it is not uncommon to observe velocities in the field that are an order of magnitude higher than computed values. The report does not indicate whether the estimated velocities have been verified in areas where a large amount of data is available, i.e., F, H, and M. In order to evaluate the actual velocities under field conditions, tracer studies should be conducted in the vicinity of L-Reactor area and the results compared with the computed values.	The ground-water travel times from F- and H-Area seepage basins to Four Mile Creek were calculated from measured flow rate values presented in the draft report "Technical Summary of Groundwater Quality Protection Program at Savannah River Plant; Volume 1 - Site Geohydrology, and Solid and Hazardous Waste" (DPST-83-829). A conservative travel time of 4.4 years was assumed for tritium transport from the L-Reactor seepage basin to Steel Creek. As the L-Reactor seepage basin will not receive continuous, large volume discharges of low pH wastewater (as is the case for F- and H-Area basins), a travel time of at least 4 times this value is actually expected from the L-Area seepage basin to Steel Creek. Sections 4.1.2.2 and F.2.10 have been revised to reflect this information.
EN-45	The Draft EIS suggests that it is unlikely for pollutants in the L-Reactor area to contaminate the Tuscaloosa aquifer because the hydraulic head of this aquifer at this location is higher than that in the Congaree Formation. The location of areas where there is a head reversal between the above two formations is given in Figure F-29. The map suggests that the head in the Congaree is higher than that in the Tuscaloosa only around the M-area and in the vicinity of Par Pond. The report states that "the map is constructed by subtracting two piezometric maps for which data are somewhat sparse." However, no information is given in the Draft EIS on (1) what data was used in developing the above figure, and (2) what is the future anticipated head difference in view of the continuous decrease of piezometric head in the Tuscaloosa formation, and future increases in pumping rates. In recent years water use for irrigation has increased rapidly near SRP. Most of the increase has occurred in Allendale and Barnwell Counties from wells in	Information on development of the Tuscaloosa-Congaree head difference map is presented in Appendix F and DPST-83-829. Also see the response to comment EN-24 on head differential. Groundwater flow directions in the Congaree and Tuscaloosa Formations have been plotted on the maps identifying the major offsite groundwater users. These maps show that the flow in these formations will be under the SRP to the Savannah River and will not reach offsite users in Barnwell and Allendale Counties. Also see the responses to comments AJ-1, DA-4, DA-5, and DA-8 regarding groundwater contamination and the barriers afforded by key clay units to the downward migration of contaminants.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	the Tuscaloosa Formation. If this trend, coupled with anticipated increase in groundwater use at the SRP facility, continues, the present head difference of about 12 feet at the L-Reactor area may decrease and likely be reversed. The consequences of possible piezometric head reversal must be addressed in the Final EIS.	
EN-46	A numerical model to assess the impact of groundwater withdrawals from the Tuscaloosa aquifer on water levels in the aquifer was proposed by Marine and Routt (1974). The sensitivity of the model depended on the accuracy of the piezometric head. Based on an accuracy of 3 and 5 feet head difference between nodes, the estimated flux was about 65 cfs (105 m ³ /min) and 30 cfs (48 m ³ /min), respectively. An error greater than 5 feet was considered to be not probable. Groundwater usage from the Tuscaloosa aquifer at SRP is projected to be 35.7 m ³ /min based on present (1982) rate of 24.3 m ³ /min plus 11.4 m ³ /min due to the increased use at L-Reactor. The total withdrawal rate from the Tuscaloosa aquifer is estimated at 70 m ³ /min, excluding any increases from municipalities, industries, or other heavy users in the area. If the actual flux is 105 m ³ /min, then present discharges amount to 70% of the estimated flux. However, if the flux is less than 100 m ³ /min, which is quite likely based on the above model, then piezometric levels in the Tuscaloosa aquifer will continue to decline. The fact that levels have been declining suggests that the estimated flux of 100 m ³ /min may not be accurate. Because the Tuscaloosa aquifer is an important source of water, a detailed investigation of this formation is essential particularly in view of the fact that in one area this aquifer has already been contaminated.	See the response to comment FK-14.
EN-47	Because of the importance of groundwater as a source of freshwater, information is needed on both the relative impact of the various activities (planned and accidental) in order to make a complete and accurate environmental assessment. The present state-of-the-art of mathematical modeling has this capability but requires accurate and detailed data base. Such a data base for the L-Reactor area is lacking and, therefore, only qualitative analysis or a highly simplistic quantitative	The EIS provides extensive discussion of potential impacts to the ground waters beneath the SRP from operation of L-Reactor including potential impacts from a cooling lake that could be used to mitigate direct thermal discharges. Analysis is based on empirical models developed from SRP study data. The predicted impacts are very small, thus there is no need for more sophisticated modeling analyses in L-Area. In addition, alternatives to the use of the L-Reactor seepage basin are presented in Section 4.4.3. As noted in response to comment EN-24, the impacts to public health and safety would be very small from L-Reactor seepage basin contaminants that might migrate to ground waters in units beneath the McBean Formation.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	one can be performed. Mathematical models such as FEMWATER and FEMWASTE, developed at Oak Ridge National Laboratories, should be employed to assess localized head reversal at pumping centers, horizontal and vertical potential migration patterns, and to provide an accurate picture on the groundwater flow regime in the vicinity of L-Reactor area.	
EN-48	The L-Reactor oil and chemical basin reportedly received in excess of 1×10^6 gallons of waste water through 1979. The chemical composition of the waste discharged to the basin is not stated and must be disclosed in the Final EIS. Although the Draft EIS states that present and future contamination of the shallow groundwater between the L-Reactor area seepage basin and Steel Creek is expected (tritium and strontium 90) no monitoring data is available; monitoring wells have only recently been installed. A detailed quantitative analysis of the present contamination in the vicinity of the L-Reactor area should be addressed in the Final EIS. Such an analysis should include water quality, contaminant plume delineation, migration rates, proposed preventative and remedial action, etc.	See the response to comment DA-11.
EN-49	The Draft EIS states that during operation of the L-Reactor, radioactive materials will be discharged to a seepage basin and "these discharges will cause contamination of the uppermost layer of the water table aquifer (Barnwell Formation)." The Draft EIS concludes that the "subsurface contamination migration is controlled by the rate and direction of groundwater flow, the adsorptive capabilities of the sediments and hydrodynamic dispersion. The sediments of the SRP exhibit greater horizontal than vertical hydraulic conductivities, enhancing lateral movement. Thus radioactive contaminants entering the water table are expected to flow to a point of outcrop on Steel Creek." The above statements are qualitative in nature and are not substantiated anywhere within the Draft EIS. Expecting the groundwater to flow from one point to another in a given time is indicative of the present serious uncertainty in the data base. All of the above statements should be substantiated by developing an extensive data base and conducting simulation studies using a verifiable mathematical model.	A detailed ground-water table elevation map for the L-Area is presented in the EIS (Section 3.4.2.1). This establishes the direction of flow and gradient along the flow path (490 meters long) from the seepage basin to Steel Creek within the Hawthorn and Barnwell Formations. Based on the ground-water elevation map, the contaminant plume will follow the water table surface. The F- and H-Area seepage basin and SRP Burial Ground plumes provide existing physical models for the L-Reactor seepage basin plume (see Du Pont, 1983; DPST-83-829 for additional details). The SRP has discharged contaminated wastewater to seepage basins in the central part of the plantsite, including L-Area basins, since the mid-1950s. The movement of radioactive materials with ground water has been studied, monitored, and modeled extensively to determine movement pattern/rate. To date, no contamination of the Tuscaloosa Aquifer in this area has occurred.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EN-50	Large volumes of liquids containing nonradioactive hazardous materials and low levels of radioactive waste have been discharged to the F and H seepage basin since 1954 and 1955, respectively. The groundwater is contaminated to a reported depth of 20 meters throughout most of the distance between the basins and the seep line springs. The contamination consists of radioactive elements, mercury, and nitrate. The Draft EIS provides little monitoring data and no information is given on whether remedial action is proposed and, if so, what is the status of the investigation. Serious contamination has been detected in the vicinity of M-area and significant concentrations of organics have been detected in soils at a depth of about 200 feet. (1000 ppb of Trichloroethylene at the Silverton Road waste site.) The volatile organics in the groundwater in the vicinity of the M-area settling basin are estimated at 27,000 kg with additional 24,000 kg residing in the unsaturated soil. It should be pointed out that these estimates, given in the Draft EIS, are preliminary, and the total weight may be significantly larger. Based on the above documented contamination, it is obvious that adding waste to the F, H, and M-areas as a result of the startup of the L-Reactor would contribute to further contamination and aggravation of the problem. The above areas should not receive any additional waste loads. Instead, remedial measures should be taken to restore the quality of the groundwater. Furthermore, seepage basins should not be used anywhere at the SRP for the disposal of any hazardous material because such activity poses a potential serious health hazard to users of the groundwater.	See Sections F.5 and F.6, Du Pont (1983; DPST-83-829) and the response to comment DA-2. Section F.5 provides ground-water monitoring data. Also see the response to comment DA-2 on incremental analyses of L-Reactor support facilities impacts, the response to comment DA-3 on separate NEPA review for the SRP ground-water protection program, and the responses to comments DA-6 through DA-8 regarding hazardous material disposal at SRP.
EN-51	It should be noted that the issue of nonaqueous phase liquids (NAPLS) is not discussed in the Draft EIS. Most halogenated organic compounds such as trichloroethylene are denser than water and will sink to deeper units. The direction of movement of such NAPLS does not necessarily coincide with that of the native groundwater. The presence of NAPLS and their effect on the groundwater supply should be addressed in the final EIS.	Sections 5.1.1.2, and F.5.4 have been expanded to discuss chlorinated hydrocarbon contamination in M-Area, protection of public health, and planned remedial actions.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EN-52	In conclusion, the Draft EIS fails to properly address the groundwater issue, i.e., what is the potential for a serious health hazard to groundwater users. The EIS addresses the hydrogeology of the L-Reactor area from a rather simplistic quantitative point of view. This treatment is a result of a significant lack of data on the geology and groundwater hydrology at the L-Reactor area. An explicit data base for this area should be collected and used as an input to a mathematical model to be used for predicting the probable outcome of various planned and accidental activities. Such state-of-the-art models are commonly used in siting of hazardous waste facilities and should be employed in the preparation of the Final EIS on L-Reactor operation.	See the responses to comments AJ-1, EN-23, EN-47, and EN-49.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
SAVANNAH RIVER LABORATORY TECHNICAL DIVISION	DPST-83-643	
DISTRIBUTION		
J. L. CRANDALL	D. E. HOSTETLER	
H. M. BOSWELL	D. R. JOHNSON	
M. R. BUCKNER	I. M. MACAFEE	
T. V. CRAWFORD	F. J. MCCROSSON	
P. L. ROGGENKAMP	W. R. MCDONELL	
H. P. OLSON (3)	G. F. O'NEILL	
H. E. MACKEY	SRL RECORDS (14)	
L. A. HEINRICH		
<u>MEMORANDUM</u>	JUNE 29, 1983	
TO: P. L. ROGGENKAMP		
FROM: D. E. HOSTETLER		
<u>ALTERNATIVES TO L STARTUP: NEW PRODUCTION REACTOR</u>		
<u>INTRODUCTION</u>		
An alternative to renewed operation of L-Reactor for increased production of nuclear materials would be the construction and operation of a New Production Reactor (NPR).		
This report describes a conceptual design for a low temperature heavy water reactor with no electricity generation (LTHWR-NE) to be built as a new production reactor at the Savannah River Plant (SRP). The reactor design is based on the proven SRP reactor design with enhancements and state-of-the-art equipment. Aluminum cladding temperatures would be the same as with current operations.		
The power and productivity of the new reactor would be greater than L-Reactor by about 30%. However, the estimated time from authorization to startup is 10 years. Thus an NPR could not contribute to material production until late 1993 at the earliest.		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	<u>SUMMARY</u>	
	A preliminary conceptual design for a low-temperature heavy water reactor with no electricity generation is described which is patterned closely after the current SRP reactor design; however, several enhancements have been included. These include: - o Full containment systems - o D₂O detritiation systems - o ECCS recirculation system - o Cooling water recirculation (cooling towers) - o Improved cooling for assemblies during discharge - o Modernized control rooms The reactor is designed to operate at 3150 MWt. The reactor contains 696 fuel assemblies which could be either of the type designed for tritium production or for plutonium production. The reactor would also be capable of producing a variety of different isotopes, a feature which has been proven by the current SRP reactors.	
	<u>I. FACILITY DESCRIPTION</u>	
	<u>A. Site</u>	
	An NPR would be located on an unused parcel of land of approximately 100 acres probably in the vicinity of Par Pond. The site would be cleared to provide space for the reactor, and administrative building, cooling towers along with cleared areas inside and outside fences to provide for adequate security surveillance. A site layout is shown in Figure 1.	
	<u>B. Schedule</u>	
	Construction of an NPR at SRP would require preliminary studies and analyses as well as final project design and construction.	

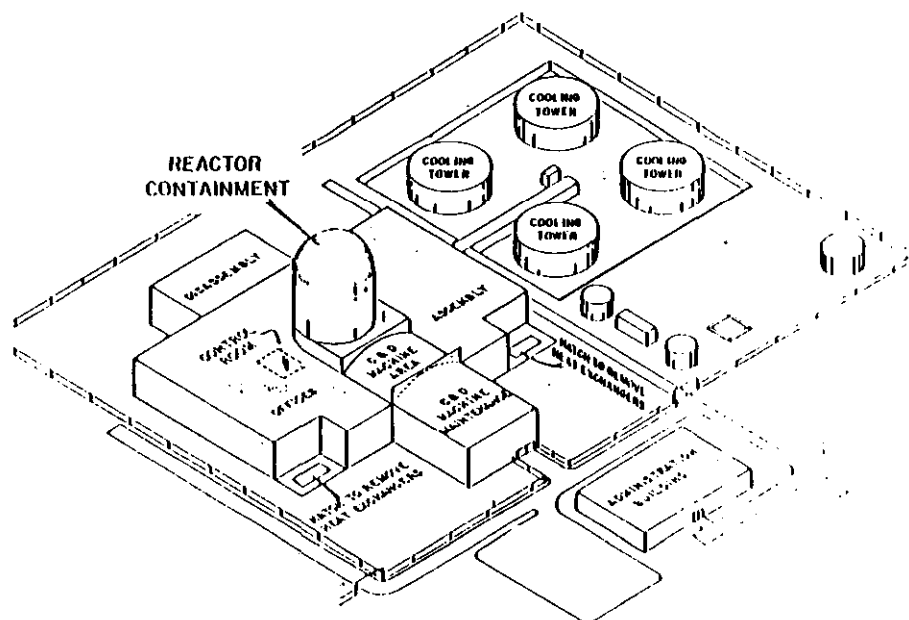
Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	The estimated time from project authorization to startup is nearly 10 years. Thus, if the project were authorized at the beginning of FY 1984, startup would be no earlier than FY 1993. The probable project schedule and milestones are shown in Figure 2. The project steps are listed below with comments on selected items.	
	(1) Technical Data Summary (TDS) The TDS would provide the data necessary for the complete specification of the reactor system with particular emphasis on systems which would be different from existing SRP reactors.	
	(2) Environmental Impact Statement The sump is placed below the reactor to catch the core in the unlikely event of a core meltdown.	
	The following descriptions of systems and components are preliminary because they represent minimum safety requirements. Additional redundancy may be expected in some systems in the final design.	
	G.1 Containment Building	
	The primary function of the containment building is to provide an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment. This building is a seismic Category I reinforced-concrete rectangular underground structure with a hemispherical dome. Figure 3 is a side view of the containment building and the above ground building which surrounds the containment dome. Figure 4 shows the side view of the containment building which includes the disassembly basin and C&D equipment and area. Above ground level, only the cylindrical shell and dome covering this shell is considered a part of the containment building. The majority of the containment building is below ground level.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

FIGURE 1. Schematic of Proposed LTHWR-NE with Cooling Towers



M-422

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
M-423	The -20 ft and -40 ft levels are shown to scale in Figure 8 and 9. The arrangement of the primary loop heat exchangers and reactor tank is similar to the P-Reactor layout. The primary loop heat exchangers can be replaced by moving them onto the railways on either side of the -20 ft level and sliding them to the lower end of the railways. A sealed opening is provided at this point. The openings are shown in Figure 1 at the two corners of the containment building. In Figures 8 and 9, the ECCS systems and main circulating pump motors are placed such that a concrete shield is between them and the reactor. The shielding is such that personnel would be able to work in these areas during actual reactor operation. In Figures 8 and 9, P indicates a pump and PM a pump motor. The upright cylindrical portion of the containment has an outside diameter of 80 feet, measures 150 ft from ground level, and has a minimum wall thickness of 3-ft. The dome portion is a hemispherical-shaped head having an inside height of 37-ft and a 3-ft thickness of reinforced concrete. The interior surface of the containment structure is lined with 1/4-in. stainless steel plates. A calculation of the containment pressure following a LOCA indicates a conservative peak value of approximately 23 psia (8 psig). Assumptions used in calculating this pressure were: - o The containment spray system is inoperable. - o No heat is transferred to the containment structure or containment heat removal system. - o The free volume of the containment building is 1198 x 10⁶ cubic feet. - o The temperature of the coolant is at 90°C.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	The estimate of the peak containment pressure is significantly less than those calculated for typical LWR's (about 50 psig). Because the design pressure is relatively low for a containment building, design of the reinforced concrete structure does not require unusual methods to provide resistance. The flat portion of the ground level roof in Figure 3 will be supported on girders and columns of reasonable sizes such that sufficiently large spans (up to 50 ft) can be designed without difficulty. Conventional methods of anchoring the reinforcing steels of the high rise tower are applicable, since the uplift force due to internal pressure is less than 20% of the weight of the tower. The auxiliary building on top of the containment has the structural effects of supporting the tower as bracings and the flat containment roof as trusses. The thickness of the containment enclosure is limited by requirements of biological shielding and tornado missile protection rather than the overpressure due to accidental steam generation.	
	G.2 Containment Spray System (CSS)	
	The CSS is designed to preserve the integrity of the containment building by removing thermal energy from the containment in the event of a LOCA and remove iodine from the containment atmosphere if core damage occurs. This system comprises two redundant trains (or subsystems), each of 100% capacity. Each train consists of a spray pump (4000-gpm capacity), a 360-degree spray head located in the containment building at the +60-ft level, spray heads in the -20 ft and -40 ft levels, and a heat exchanger (shared with the SDCS), and associated piping and valves. Each train draws independently from a demineralized water tank containing 200,000 gallons of borated light water. In addition, a sodium hydroxide storage tank containing 9000 gallons of 20% NaOH solution and two independent mixing systems are provided for iodine removal. The NaOH solution mixes with 10% of the containment spray flow in an eductor located in a side stream from the pump discharge, and the mixture is injected into the pump suction. The spray eductor mixes the solution and meters for proper pH control.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

STATEMENT OF WILLIAM A. LOCHSTET, PH.D.

The Pennsylvania State University
104 Davey Laboratory
University Park, Pennsylvania 16802

College of Science
Department of Physics

11 November 1983

Mr. M. J. Sires, III
Assistant Manager for Health,
Safety and Environment
U.S. Department of Energy
Savannah River Operations Off.
P.O. Box A
Aiken, S.C., 29801

Dear Mr. Sires:

Enclosed are my comments on the Draft Environmental Impact Statement on L-Reactor Operation at Savannah River Plant, DOE/EIS-0108D. Please note that the opinions and calculations presented do not necessarily reflect the position of the Pennsylvania State University.

I will be looking forward to the Final Environmental Impact Statement. Would you also please send me a copy of that Final EIS when it is available.

Sincerely,

Wm. A. Lochstet, Ph.D.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Some Environmental Consequences of L Reactor Operation by William A. Lochstet, Ph.D. The Pennsylvania State University* November 1983	
E0-1	The Department of Energy (DOE) has prepared a Draft Environmental Impact Statement on the resumption of operation of the L-Reactor at the Savannah River Plant, DOE/EIS-01080 (Ref. 1). The L Reactor operated from 1954 until 1968 for the purpose of producing special nuclear materials (plutonium) for nuclear weapons (Ref. 1, P. 2-7). Thus, the design of this reactor is over 30 years old, and does not reflect the learning that has been achieved since. In particular, water is pumped into the reactor vessel at the top and out thru connections at the bottom. In the case of the break of an exit pipe, the cooling water would simply run out. Modern reactors deflect the exiting water to connections near the top.	The design of the L-Reactor, as that of all other SRP reactors, has been upgraded since initial startup in 1954 and currently reflects the lessons learned during the long period of SRP reactor operation as noted on p. 4-42 of the draft EIS and in Appendix J. In case of a pipe break, the ECS is designed to provide adequate core cooling, no matter where the break occurs, i.e., also in the case of an exit pipe rupture.
E0-2	The power of the L reactor is quoted as 650 to 2915 MW (T), with a typical operation at 2350 MW(T) (Ref. 1, PP.G-11, 2-14). This is similar to the rate of heat production in modern commercial reactors. For example, the heat production rate at Three Mile Island unit 2 had a maximum rate of 2772 MW. If the L reactor were to operate continuously for one year at its "typical" rate of 2350 MW, it would fission 1300 lb (600 kg) of uranium - 235 (U-235). Since natural uranium usually contains 0.71% of the isotope U-235, it will be necessary to obtain at least 85 metric tons (long tons) of uranium metal to fuel this reactor for one year. Since the average uranium mill operates at 96% efficiency, at least 88 metric tons of uranium will have to be mined. The uranium mill will leave 4%, or 3.5 metric tons of the uranium in the mill tails which are discarded. These tails will also contain 1.5 kg of thorium-230.	The environmental effects of uranium fuel requirements for light-water power reactors (including those effects postulated by Pohl) have been examined extensively in a number of public proceedings conducted by the NRC. In each instance, the hearing board has reaffirmed that radon releases associated with such requirements are "...a minute fraction of the radon that is released into the atmosphere from other sources..." and that the "... incremental health risk to the population stemming from the fuel cycle emissions (if indeed there is any) is vanishingly small..." (USNRC, Atomic Licensing & Appeal Board, ALAB-701, November 19, 1982). The uranium fuel requirements for L-Reactor are significantly less than those of a nominal light-water power reactor.

*Affiliation for identification purposes only.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
M-427	In 1976 Pohl pointed out that the thorium decays to radium-226, which in turn decays to radon-222, which is a health hazard (Ref. 2). The uranium-238 in the mill tailings decays thru several steps to radon-222 and should be considered, as was noted by the NRC in GESMO (Ref. 3). The total decay of this 3.5 metric tons of U-238 and 1.5 kg of thorium-230 will yield 5.1×10^{11} curies of radon-222. Because radon-222 has a half life of only 3.8 days, some radon-222 atoms decay before escaping from the tailings pile into the atmosphere. At present some recent mill tailings piles have two feet of dirt covering. In this case, the EPA estimate (Ref. 4) is that about 1/20 of the radon produced escapes to the air. Thus, only about 2.5×10^{10} curies of radon escape to the air. The population at risk is taken to be the United States, stabilized at its present number and distribution. This is similar to recent estimates taken by the NRC (Ref. 5). Further, the NRC has suggested that a release of 4,800 curies of radon-222 from a western mine site, would result in 0.023 excess deaths in the present population. This provides a ratio of 4.8×10^{-6} deaths per curie released (Ref. 6). Applying this factor to the 2.5×10^{10} curies of radon released, results in 121,000 deaths. It should be recognized that these deaths occur over a long time, governed by the 4.5 billion year half life of U-238. This is also a minimum estimate, due to the need for greater amounts of uranium than are indicated here. This estimate also assumes that the U.S. population is not decimated by a nuclear war. In this case, the impact of L reactor operation would be quite different.	
	EO-3 To consider nuclear war, it is necessary to estimate the contribution of L reactor production to that war. For the moment, assume that the breeding ratio of the L reactor is 1.0. Then, in each year of operation, 1300 lb (600 kg) of plutonium will be produced. Since each nuclear bomb contains about 10 kg of plutonium (Ref. 7, P. 182) this means 60 warheads for each year of production. Since typical targets in a nuclear war have populations of 50,000 or more, consider an	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	average population of 100,000. Thus, one year's production of the L reactor would destroy 60 communities and six million people. This reactor would enable the death of six million civilians for each year of operation. That is the same as the number of people killed within Germany (i.e. Jews) during WW II. This holocaust was treated harshly at the Nuremberg trials of war criminals after that war. The principle established there, is that each person is responsible for their own actions, and it is not enough to claim that one is simply following orders. This principle of international law should be applied here.	
EO-4	The National Environmental Policy Act of 1969 (NEPA) requires a comparison of the costs and benefits of a federal project. In this case, it has been shown that the costs of one year of operation is 121,000 deaths. Ten year's operation would result in over a million deaths. This is to be compared with the benefits. The benefits are six million deaths for each year of operation, or sixty million (60,000,000) deaths for ten years of operation. 60,000,000 deaths is not a benefit. There is no benefit. NEPA requires no operation of the L reactor. The decision to restart the L reactor in January 1984 is contrary to NEPA. It is necessary to perform a cost/benefit assessment fully and in good faith as required by the court in Calvert Cliffs Coordinating Committee v. USAEC 449 F. 2nd 1109 (D.C. Circ., 1971): We conclude, then that Section 102 of NEPA mandates a particular sort of careful and informed decision-making process and creates judicially enforceable duties.... But if the decision was reached procedurally without individualized consideration and balancing of environmental factors--conducted fully and in good faith--it is the responsibility of the courts to reverse. Thus the decision of DOE must satisfy NEPA rather than the FY 1983-1988 Nuclear Weapons Stockpile Memorandum of the president (Ref. 1., P. S-2).	See the responses to comments AB-4 and AB-5 regarding the discussion of costs vs. benefits and the discussion of need in this EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EO-5	It is suggested that restart of the L reactor with its present cooling method would result in the discharge of water at 70°C (158°F) to 80°C (176°F), at the reactor outfall. It is further suggested that this water would enter the swamp at 40°C (104°F) to 45°C (112°F) (Ref. 1, P. 4-8). This would be a clear violation of the Clean Water Act. Such operation must not be considered, even temporarily.	See the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives.
EO-6	Section 8.2 lists irretrievable commitments of resources for L reactor operation. The discussion does not indicate the uses of these resources. In particular, energy is used to enrich the fuel uranium (Ref. 1, P. G-11), and the electricity used in the enrichment process should be included as a committed resource.	NRC has presented the annual electrical energy requirements for enrichment of the fuel for a nominal 1000 Mwe LWR [10 CFR 51.20(e) - Table 5-3] as 323,000 Mw-hrs. As indicated in the response to comment EO-2, the enrichment requirements for L-Reactor would be less.
EO-7	Prior to the accident at Three Mile Island in 1979 the NRC considered accidents with 100% fuel failure as being too improbable to consider. DOE should, must, consider 100% fuel failure accidents in this case. In particular, it is unlikely that a large fuel failure accident would be contained. The emergency cooling system can supply water at 53,000 liters per minute (Ref. 1, P. G-42). However, the building sumps are pumped into tanks with 2.1 million liter total capacity (2,100,000 liter) (Ref. 1, P. G-43). These tanks will fill up in 40 minutes. After that time water would flow to a 190,000,000 liter excavated basin (Ref. 1, P. G-43). Such flow would release very large quantities of radioactivity to the environment. That may have been considered acceptable as reactor safety when the plant was designed in the early days, but is clearly unacceptable today. In particular, the letter of Arthur H. Dexter which appears in the Draft (Ref. 1, PP K-74 to K-79) provides a very direct discussion of accidents which must be addressed. It is not (after TMI) credible to merely say that an accident with 100% failure is too low in probability. The 100% fuel failure accident must be contained. It did happen at one large reactor in 1979 and may happen again, although by an entirely different initiation scenario. Since the events that led to the TMI accident are so well known, it is clear that that exact sequence will be properly handled when it happens. Further, as DOE indicates, the L reactor design is rather different, so that exact sequence is meaningless at the L reactor.	See the responses to comments BL-2, BL-3, and BL-4 regarding analysis of accidents involving 100 percent fuel-melting. As noted in Section G.5.6 of the EIS, no fuel melting is expected in any probable loss-of-coolant accident. In the unlikely event of fuel melting, only minimal quantities of fission products and other contamination would be expected to be carried to the 190-million-liter earthen basin for the reasons discussed in Section G.5.6. Several sections of the EIS were specifically written to address Mr. Dexter's comments. See also the responses to additional comments made by Mr. Dexter in comment letter CW in this appendix. See the response to comment BF-7 regarding design differences that make SRP reactors less susceptible to accidents resulting from inadequate cooling (TMI type of accident) than commercial power reactors.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
E0-8	This draft EIS is deficient in many aspects. There is no discussion of the operations required to supply fuel to the reactor. In particular, it is shown here that the mining of uranium for one year's fuel supply will lead to at least 121,000 deaths. There is no consideration of the environmental impact of the product (plutonium), or of its possible use in warfare. The proposed method of once-thru reactor cooling does not protect the environment. And, finally, the discussion of loss of coolant accident is totally inadequate. This Draft does not satisfy NEPA. Further, the proposed action to restart the L reactor does not satisfy NEPA and other requirements, including the Clean Water Act. I hope that these issues are addressed in a substantive way in the Final EIS, and in the Secretary's decision on restart.	See the responses to comments E0-1 through E0-7.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>References</u> 1 Draft Environmental Impact Statement, L-Reactor Operation, Savannah River Plant, Aiken, S.C.; DOE/EIS-0108D, Draft, DOE, September 1983. 2 R. O. Pohl, "Health Effects of Radon-222 from Uranium Mining," Search, <u>7</u> (5), 345-350 (August 1976). 3 "Final Generic Environmental Statement on the Use of Recycled Plutonium in Mixed Oxide Fuel in Light Water Cooled Reactors," GESMO, NUREG-0002, NRC (August 1976). 4 "Environmental Analysis of the Uranium Fuel Cycle, Part I - Fuel Supply," EPA-520/9-73-003-B, EPA (October 1973). 5 Draft Environmental Statement Related to the Operation of the Shearon Harris Nuclear Power Plant, Units 1 and 2; NUREG-0972, Draft, NRC, April 1983, Page C-3. 6 Health Effects Attributable to Coal and Nuclear Fuel Cycle Alternatives; NUREG-0332, Draft, NRC (September 1977). 7 "Nuclear Energy - Its Physics and Social Challenge;" David Rittenhouse Inglis, Addison-Wesley, 1973.		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF JOHN H. MACLEAN		
November 11, 1983		
Mr. M. J. Sires, III Department of Energy Savannah River Operations Office P.O. Box A Aiken, S.C. 29801		
Re: L-Reactor		
Dear Mr. Sires:		
There are several points in the draft EIS that should be clarified:		
1. On page 2-2 of Volume 1 of the draft EIS it is stated that although theoretically weapon materials, i.e., Plutonium 238 could be produced directly from existing spent fuel from commercial light-water reactors, this is not a practical alternative as the Atomic Energy Act prohibits the use of fuel produced in commercial reactors for the production of weapons.		
EP-1	This statement is misleading. The production of weapons materials from commercial reactors is not theoretically possible - It is possible. Second, commercial spent fuel is just a nicer name for nuclear waste composed in part of plutonium 238 and 240. The L-Reactor will not produce any electricity. It's only purpose is to produce nuclear waste composed of this same plutonium 238 and 240. This waste will then be chemically separated so that the 238 becomes concentrated with a low percentage of 240 remaining. Technically, the only difference between the two wastes - those produced by commercial reactors and those produced by L-Reactor is that the L-Reactor waste will have a lower amount of 240 prior to chemical separation.	See the response to comment BY-2 regarding the use of spent fuel as a source of plutonium.

M-432

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
M-433	Commercial waste is readily available. At the moment, no one in government or business has a solution to the problem of permanent disposition of this waste. At the moment, the waste is being buried on the plant site of commercial nuclear reactors. Since they are not designed for this, their lack of land space will force some of them to shut down in the not too distant future. A limited part of the waste is going to Barnwell where the uranium is chemically separated from the plutonium and is re-used. This existing Barnwell operation is almost identical to that contemplated at L-Reactor with the only real difference that legal title to L-Reactor nuclear waste is in the name of the Department of Energy while the other is in the name of Georgia Power, Duke Power, etc.	
	Using commercial waste would mean that the plutonium 238 could be produced without any delay due to problems with containment domes, cooling towers, cesium in drinking water or destruction of 1000 acres of marshland since no re-start of L-Reactor would be necessary. Using commercial waste would mean that commercial reactors would not have to bury their waste on site and possibly have to close down as space runs out. Instead, it can be shipped to Savannah River Plant or Barnwell for separation.	
	The bottom line is that it will save everyone <u>money</u> by using commercial waste. It will save the power user as commercial reactors will have a longer life. It will save the government <u>money</u> by not having to pay for restart construction, possibly cooling tower or containment dome. Certainly it will save money as far as holding public hearings and writing environmental studies <u>ad nauseam</u>. The only people who might lose money is DuPont. Finally, It will save the people of Beaufort, Port Wentworth, Savannah and Augusta their peace of mind and maybe their health.	
	Your response that the law forbids it cannot go unanswered however. At page S-1 of volume I of the Draft EIS you quote President Reagan to wit:	
	"As a matter of policy, national security requirements, not arbitrary constraints on nuclear availability...shall be the limiting factor in the nuclear force structure."	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
Running throughout the EIS is the theme that there can be no delay as to start up of the L-Reactor for our national security is at stake. If this is true, I can see no opposition from President Reagan (not from Congress considering their vote on the military budget) for an amendment to the Atomic Energy Act allowing commercial waste to be reprocessed so as to separate out plutonium 238. If our national security was at stake in 1980 surely it was worth a try to amend the Act, since if successful, no delay in upgrading our weapons would have occurred. As it is, the DOE's proposal to restart L-Reactor has resulted in a delay of weapons upgrading from 1980 to 1984 - the projected starting date of the L-Reactor. Please comment on the above as well as what efforts have been made to allow commercial waste to be used in weapons material production.	2. Another point that needs classification is the number of cancer deaths and genetic defects that will result because of the L-Reactor. At one point in the EIS it is mentioned that there will be 4 per thousand cancer deaths per year and 7 per thousand genetic defects. (page 5-17) At other places these figures are mentioned as excess deaths. If the figures are really based on per thousand population you can't be asking 400 Savannahians to die a year and 700 babies to have defects because of the L-Reactor? You must mean the percentages are based on existing cancer deaths and defects. You need to clarify in the final EIS exactly how many cancer deaths and defects can be expected in the population from Augusta to the coast. Also explain the different figures on pages 5-17 and 5-19 for these.	See the response to comment CT-1.
EP-3	3. Your main reason for not building a cooling tower is that it will delay L-Reactor startup, i.e., national security considerations. You do not deny that a cooling tower will mean lower amounts of water being pulled from the Savannah River, or that Steel Creek will be less affected with the consequence that the cesium in the bed will not be flushed out into the Savannah River. I can find no reason for the cooling tower not being built. You state in the EIS that it could be built in 18 months and then simply cut into the L-Reactor system. Thus,	See the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives. NUS Corporation did not "recommend" cooling towers as a preferred alternative. The preliminary presentation to DOE-SR prepared by NUS and as acknowledged by NUS used engineering and environmental factors that were treated with equal weight. The fact that cooling towers ranked higher was an output of the rating system employed and was not a sufficient basis for a

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	you could have no delay in the startup and 18 months from now you could simply cut it in. This would protect Beaufort and Port Wentworth's drinking water. The 39 million cost is negligible considering the cost of startup and the protection a cooling tower would give. Furthermore, your own consultants (NUS) recommended it.	recommendation. Since the NUS presentation additional alternative cooling-water systems have been analyzed. Also see the response to comment AA-1 regarding cooling-water alternatives.
EP-4	4. You have not adequately explained how the cesium got into Steel Creek. Obviously there have been leaks from the primary coolant to the secondary coolant to Steel Creek. Why not have a third loop in the cooling system and have monitors in the secondary and third cooling loops to detect leaks? A cooling tower would also help in this regard as it could serve as a last resort holding tank before Steel Creek in case of a major leak.	Discussions on the cesium-137 releases from P- and L-Areas to Steel Creek are provided in Sections 3.7.2.1 and D.1.1. As contained in these sections, these discharges resulted from leaking reactor fuel elements with cladding failures that exposed the underlying fuel to the spent fuel storage and disassembly basin water, and not from leaks between primary and secondary cooling-water systems.
EP-5	5. Nowhere in your EIS do you explain what has been done to the L-Reactor. As I understand it, the pipes were rusting and pigeons were nesting in the reactor. Certainly there had to be metal fatigue from the 12 years of operation. Please explain what parts of the L-Reactor were refurbished or replaced for startup, as it bears on the safety aspect of the system.	See the response to comment CF-3 regarding the scope of L-Area restoration and safety improvements, and the response to comment CU-3 concerning metal fatigue and effects of neutron radiation upon the reactor tank.
EP-6	6. Nowhere in the EIS do you explain why plutonium from the old bombs and missiles you seek to replace cannot be reused rather than making new plutonium. This needs to be addressed.	See the response to comment BL-19 regarding use of material from retired weapons. Additional information on this subject has been included in Section 1.1 of this EIS.
EP-7	7. Prior to the refurbishing of the L-Reactor, the monitors for alpha and other radiation were TLD's which are inadequate as they take a cumulative measurement, not an instantaneous one. Furthermore, they were located on the perimeter, not in the stock area. From now on you are going to use gamma spectrometers which are more accurate. However, are not your figures in the EIS for radiation dosage based on the inaccurate TLD measurements of past years and thus, unreliable?	The TLD's referred to are used in the environmental radiological monitoring program. This program is designed to monitor concentrations of radioactivity in the environment (air, water, soil, vegetation, and animals) outside SRP facilities and associated gamma radiation levels, and will be continued to be used in this manner. The results of the monitoring program are reported annually, as in the 1982 annual report, DPSPU 83-30-1, entitled Environmental Monitoring in the Vicinity of the Savannah River Plant. The environmental radiological monitoring program is different from the radioactive effluent monitoring program. The latter is designed to characterize and quantify airborne and liquid radioactive releases from SRP facilities. The radioactive

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		effluent monitoring program is described in Section G.3.1.5 of the EIS. Included in this program are continuous in-stack monitors for gaseous radioactive releases, using gamma spectrometry and for tritium using ion chambers. Particulate releases that would include alpha emitters are monitored based on the analysis of periodic filter samples drawn from the stack. The radioactive effluent monitoring program planned for L-Reactor is similar to that used for all SRP reactors in the past. The estimated releases reported in the EIS are based on actual reactor experience in the past at SRP using reliable measurements.
EP-8	8. Your EIS states in essence that security at the SRP is adequate. The enclosed article from the Georgia Gazette of November 3, 1983 says otherwise. Is Representative John Dingell correct that the DOE's own report of January 1983 concluded that safeguards were "a shambles?" Why does the EIS say otherwise?	DOE is in compliance with the agency's orders regarding safeguards and security. This topic is discussed briefly in the EIS to inform the reader that appropriate measures are being followed.
EP-9	9. The final EIS should contain the list of radiation doses considered safe by the NRC in 10 CFR 20. Although the EIS virtually drowns the reader in figures, they are meaningless without a guide as to how many rems are considered safe. You should put the NRC's tables in the EIS and also state how DOE differs from those and why you are following DOE's safety standards, not NRC's. Also, a definitional section would be very helpful for the public to understand rad, rem, curie, etc. As it stands now the EIS is unreadable as it consists of mostly chart after chart with little explanation. You should gear the final EIS to layman's level even if it takes a dozen volumes to do it. I enclose copies of 10 CFR 20 which I think should be included.	The DOE radiation protection guides (DOE Order 5480.1A, Chapter 11) are comparable to the NRC dose limits contained in 10 CFR 20 for a production facility. Also see the responses to comments BF-6 through BF-8 regarding radiation protection standards and differences between SRP and commercial light-water reactors. Volume 1 of this EIS contains a glossary of technical terms used in this EIS. The summary, located in the front of this EIS, has been revised in an attempt to provide a more readable summation for the lay reader.
EP-10	10. Nowhere in the EIS does it mention what result the L-Reactor will have on the industries down river. Many industries such as Savannah Foods and Union Camp use this water in production. If cesium radiation is a concern to the	The same detection of liquid radioactive releases to the Savannah River assumed for evaluating downstream drinking water concentrations would apply to water used for industrial purposes downstream. Since the resulting concentrations of

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	communities drinking from the Savannah River Is it not also a concern of industry. What effects will the radiation have on industrial water use?	radionuclides are well below EPA drinking water standards and associated radiation doses are low, L-Reactor startup and operation will not affect the suitability of the water for industrial use.
EP-11	11. Doesn't thermal discharges contemplated because of the L-Reactor exceed limits for class B streams currently set by the S.C. Department of Health and Environmental Control? How are you going to get around this in order to get a permit?	See the response to comment AA-1 regarding issuance of an NPDES permit for thermal discharge.
EP-12	12. Doesn't the effects of a meltdown at L-Reactor exceed those permitted by NRC in 10 CFR 100? Why not comply with NRC's figures even though you are not required? Also, doesn't the cumulative radiation dose following startup exceed by a factor of 2 NRC standards? Again, why not comply?	See the responses to comments BL-2 and BL-11 for L-Reactor's ability to meet dose criteria of 10 CFR 100. See the responses to comments BF-6 through BF-8 regarding the comparability of DOE and NRC radiation protection standards.
EP-13	13. The final EIS should explain in its "Accidents which have happened" section how the SRP released 479,000 curies of tritium into the atmosphere in 1974, the largest of any nuclear facility in history. How did it happen and what prevents it from happening again?	See the responses to comments AB-10 and BA-4 regarding tritium releases.
EP-14	14. Please give details in the final EIS of where you will be drawing your operators from and the experience and training they will have. The TMI accident was compounded by operator error because of inadequate training. L-Reactor cannot afford that.	The program to staff and train sufficient operating personnel was initiated in 1980 along with the program to refurbish the reactor. All supervisors and operators that will be responsible for operating L-Reactor will have been fully trained and certified in accordance with SRP's formal training program. All will have on-the-job operating experience obtained at the operating SRP reactors along with special training on the minor differences between L-Reactor and the other three SRP reactors.
EP-15	15. Would you consider making available a guided public tour through the L-Reactor on specific dates as the concerns of those at the hearings might be calmed by actually viewing the safety systems?	Tours of the SRP facilities (including L-Reactor) are restricted due to security requirements. DOE, will provide lectures to interested persons, groups, and organizations on request.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EP-16	16. Finally, the real problem, with the startup of the L-Reactor is that the L-Reactor is not the problem. Instead, it is the millions of gallons for high and low level radioactive waste that are stored in the ground. You should just move it to some salt mine in Nevada and get it away from population centers and the Tuscaloosa aquifer. It doesn't matter how careful you are, danger exists of a leak and subsequent poisoning of the aquifer. The result will be to turn coastal Georgia and South Carolina into a desert. Already toxic chemicals from the M-area seepage basin have contaminated the aquifer (Vol. III, page D-83, EIS) and wells have been closed in towns near SRP (Sav. Morning News, 5/8/83).	As discussed in Section 5.1.2.8 of the EIS, operation of L-Reactor will produce 380-760 cubic meters of concentrated high-level waste each year. The Defense Waste Processing Facility, now under construction is scheduled to commence processing this waste into borosilicate glass beginning in 1989-90 for eventual disposal in a Federal geologic repository. No liquid low-level waste is expected to result from L-Reactor operation. No wells have been closed in any towns near SRP due to contamination from SRP, nor has there been any evidence of such contamination. See the response to comment AJ-1 regarding ground-water contamination.

Very truly yours,

John H. Maclean

JHM/ah

cc: Sen. Mack Mattingly

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

STATEMENT OF JOHN M. CROOM

QUANTITATIVE APPLICATIONS
Environmental and Statistical Sciences
1000 Montreal Rd. 55A
Clarkston, Ga. 30021

November 14, 1983

Mr. M. J. Sires, III
Health, Safety and Environment (DOE)
Savannah River Operations Office
PO Box A
Aiken SC 29801

Dear Mr. Sires:

I am pleased to submit these comments prepared for Energy Research Foundation on the DEIS for L-Reactor, Savannah River Plant. These comments are in addition to my comments on Appendix D submitted directly by Energy Research Foundation. These comments pertain to impacts to fish populations and focus on portions of Volume 1: Sections 3 and 5.

I have a Ph. D. in biology and have worked in radiation ecology, population modeling and environmental impact assessment as a consultant for the last seven years. I have served as a technical witness before EPA and FERC and have considerable experience in preparation and review of environmental impact statements. I hope that my comments are of use to you in preparation of the EIS for L-Reactor operation.

Sincerely,

John M. Croom

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
M-440		
Comments to DEIS L-Reactor		
EQ-1	Population Impacts to Savannah River fish species includes those killed directly (entrainment and impingement) and population reduction resulting from habitat destruction and concomitant reduction in biological energy input (allochthonous detritus). The DEIS does not estimate total impact as it fails to take into account habitat destruction and impingement, and the effects each has on the size of fish populations in the Savannah River. Only entrainment is estimated as a percentage impact on upper Savannah River fish species (19% for C-, K- and L-Reactors inclusive).	The cumulative impact of impingement on Savannah River fishes due to L-Reactor operation is described in Section 5.2.5.3 of the EIS. The impact of direct discharge on the fishes of Steel Creek and swamp are discussed in Section 4.4.2 and 5.2.5.1. The determination of the total size of the fish population in the Savannah River is beyond the intended scope of the extensive fishery studies being conducted by both the DOE and the Georgia Department of Natural Resources. However, Section 6.1.3 of the EIS describes the 2-year comprehensive cooling-water study which will assess the entrainment, impingement, and thermal impacts of SRP operations on river fish populations from Augusta downstream to the area of salt water intrusion (River Mile 40). The State of South Carolina, the State of Georgia, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers are participating in this study.
EQ-2	Currently, approximately 1400 acres of SRP wetlands are thermally impacted as a result of once through cooling; operation of L-Reactor as proposed will increase this to a total of approximately 2100 acres or 10% of all SRP wetlands with access to the Savannah River. SRP wetlands are essentially the uppermost wetlands of the Savannah River as (1) Hartwell Reservoir is only approximately 40 km upstream from which little organic matter is contributed to the Savannah River, and (2) the 40 km of the Savannah River above SRP has little wetlands because it is in the piedmont (most wetlands occur in the coastal plain). Wetlands serve as primary processors of allochthonous detritus and breeding, nursery and feeding areas for native and migratory fish species of the Savannah River. Destruction of wetlands must be taken into account in the EIS as an impact to Savannah River fish populations; in the DEIS, wetland destruction is not related to fish populations.	The impacts of wetland losses as related to river fish populations due to the operation of L-Reactor are described in Chapters 4 and 5 and Appendices C and I of the EIS. Also see the responses to comments DR-1 through DR-3 regarding wetlands and fishery impacts.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EQ-3	Total fish population impact of L-Reactor operation must include all impacts associated with water withdrawal from the Savannah River; the DEIS only addresses entrainment in a way that results in a quantitative estimate of population impact. The DEIS provides an estimate of total fish (by species) expected to be impinged at L-Reactor and a total for all reactors but fails to relate total impingement to fish population impact. Fish surveys during 1982 and 1983 included unit-area electro-fishing and hoop net collection. Hoop net collections could have been used for a mark/recapture program but, if it was not done, it is too late now. Population estimates of fish species can be obtained by scaling up the numbers of each species collected in unit-area electro-fishing. While such population estimates may be inaccurate due to collection method, the estimate could be used to estimate impingement impact and would be better than nothing. If extrapolation from electro-fishing collections is considered imprudent because of method shortcomings, impingement impact can be estimated as a ratio of impingement/entrainment from studies in similar rivers or southeastern US cooling reservoirs. It is essential that fish population impact be assessed as "total expected population reduction" from all causes. Adding impingement and habitat destruction to the 19% entrainment impact may result in a total population reduction as high as 30%. Such an impact would be dangerous to the viability of upper Savannah River fish populations. Impacts less than this possible impact have resulted in decisions to obviate the impact through construction of cooling towers or other alternatives to once-through cooling.	A mark-recapture program was included in the adult fish surveys for both 1982 and 1983 using hoop nets and electrofishing. However, sufficient numbers of recaptures were not achieved to provide a statistically valid estimate of the adult fish population. Furthermore, in an open system such as the Savannah River, mark-recapture techniques for estimating fish populations are extremely difficult because they are often biased, inconclusive, and unrepresentative. Therefore, it was not possible to evaluate impingement impact on the total fish population in the Savannah River. Fish impingement at the SRP, however, is very low, rarely exceeding 1-2 pounds per day. Also see the responses to comments AA-1, AB-13, and EQ-1 (above).

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
M-442	Department of the Army Savannah District Corps of Engineers P.O. Box 889 Savannah, Georgia 31402 November 14, 1983	
	Reply to Attention of: Planning Division	
	Mr. M. J. Sires, III Assistant Manager for Health, Safety and the Environment Savannah River Operations Office P.O. Box A Aiken, South Carolina 29801	
	Dear Mr. Sires:	
	Reference is made to letter from Mr. Richard P. Denise of your office dated September 23, 1983, which was sent to the Office of Chief of Engineers, Washington, D.C.	Comments noted.
	The Savannah District, U.S. Army Corps of Engineers, has reviewed the Draft Environmental Impact Statement (EIS), "L-Reactor Operation, Savannah River Plant, Aiken, South Carolina." The restart of the L-Reactor will not affect any structures or operations within the authority of the Savannah District. The Charleston District is responsible for any permit actions associated with the restart of the L-Reactor. We have no additional comments to make at this time; however, we would like to receive a copy of the Final EIS when it becomes available.	
	Thank you for the opportunity to comment.	
	Sincerely,	
	Charles E. Dominy Colonel, Corps of Engineers Commander	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF ROBERT ALVAREZ Environmental Policy Institute 317 Pennsylvania Ave., S.E. Washington, D.C. 20003 November 14, 1983 Mr. M. J. Sires Savannah River Plant Department of Energy PO Box A Aiken, South Carolina Dear Mr. Sires: On behalf of the Environmental Policy Institute, a Co-Plaintiff on the L-Reactor lawsuit, I wish to make the following comments relative to the Draft Environmental Impact Statement (EIS) on the L-Reactor start-up at SRP: For the past three years, EPI has been seeking and analyzing environmental radiation monitoring and release data, collected by the E. I. du Pont de Nemours and Co. for the federal government, from pre-plant operations (1951) to the present. After reviewing the draft EIS for the L-Reactor start-up, we find that the DOE has failed to address the cumulative dose to the public from SRP operations since the 1950's. The draft EIS appears to only address the recent operating history of SRP. EXTERNAL GAMMA RADIATION Measurements of environmental gamma radiation taken by Du Pont for the federal government covering the period 1956-59 (the first half of SRP's operating history) have been analyzed by EPI. After adjusting for improved monitoring techniques and shielding from buildings the collective gamma dose to residents in the vicinity of SRP during this period ranges from 170,000 to 280,000 person-rem. Without adjusting for shielding, the collective dose is 420,000 person-rem.		
ES-1		See the response to comment AB-17 regarding documentation of prior radioactive releases and doses.
ES-2		External gamma dose measurements made in the SRP site vicinity do not distinguish between sources, but include contributions from all sources. However, the most significant contributor to these external gamma dose rates is natural background radiation consisting of cosmic radiation and terrestrial radiation as discussed in Section 3.7.1.2. The contribution of radioactive releases from SRP facilities to the external gamma dose rates is less than 0.1 percent. Doses due to fallout reported in

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	There are three possible explanations for these doses: (a) Releases from SRP facilities; (b) fallout from atmospheric nuclear weapons explosions or; (c) a combination of the two. The evidence, however, suggests that SRP is the principal source of these doses. Integrated external "excess" doses measured around SRP do not agree with weapons test fallout measurements taken at comparable locations leaving more than 85% of the gamma dose around SRP unexplained.(1) Moreover, less than 0.02% of the theoretical annual production of short-lived noble gases in five SRP reactors could have caused this exposure.(2)	the literature are not directly measurable in terms of gamma dose rates. Radioactivity associated with fallout is measured in terms of concentrations in air, water, soil, and vegetation. Doses associated with fallout are then calculated by considering exposure of individuals by the inhalation, ingestion, and external exposure pathways. Most of the doses associated with fallout determined in this manner are due to inhalation and ingestion of radioactive fallout particulates, and not external exposure.
	HEALTH EFFECTS	
ES-3	The health effects from gamma doses measured in the vicinity of SRP can be estimated on the basis of dose-risk relationships established by various scientists and committees. The numbers vary substantially. Underscoring the wide range of uncertainty relative to radiation risk estimates are major contradictions discovered recently in dosimetric (3), cancer incidence(4), and non-cancer data (5) on the Japanese atomic bomb survivors. These contradictions have effectively rendered all BEIR, UNSCEAR, and ICRP risk estimates to be tenuous at best. Moreover, direct observations of humans exposed chronically to low-dose ionizing radiation show higher risks by at least a factor of ten and have raised serious doubts about extrapolating mutational effects from groups who have received tissue destructive-high-doses. Thus it is more appropriate to approach health effects in the context of SRP by examining the range of risks. In this regard, the BEIR II Committee in its 1972 report expresses a value of 360×10^{-6} cancers per rem.(6) The 1980 BEIR III report because of a failure to reach consensus does not give a uniform recommendations.(7) K. Z. Morgan derives from the Hanford Survey of Mancuso, Stewart and Kneale a dose-risk relation of 7000×10^6 cancers per rem.(8)	The understanding of the biological effects of ionizing radiation is quite substantial. The subject has received intense review by the National Academy of Sciences and continues to receive intense review. The NAS Committee on the Biological Effect of Ionizing Radiation (BEIR) in the BEIR III report revised downward their earlier assessment of health effects for a given exposure level of radiation in the BEIR II report. From statistical analyses there is no correlation of actual cancer death rates with radiation for regions of the U.S. (Denver, western mountain states) in which the background radiation levels are well in excess of the average radiation exposure in the U.S. Also see the responses to comments AB-12, AB-17, and AV-8 regarding the BEIR III report and the effects of SRP releases.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
ES-4	Under this range of risk coefficients, the lower population dose estimate (170,000 person-rem) is expected to yield 61 to 1000 additional cancer deaths. For the higher population dose estimate (280,000 person-rem), the respective range would be between 100 and 2000 additional fatal cancers. By not adjusting for shielding from buildings (420,000 person-rem) the expected range is 151 to 2940 excess fatal cancers. By contrast, the du Pont Co., based on a recent draft report on crude mortality rates in the vicinity of SRP (9) suggests the average annual collective dose from SRP from environmental exposures to be 225 person-rem; and from fallout to be 2070 person-rem. However, these estimates are not reconciled with Du Pont's own environmental gamma measurements, particularly those taken during the first half of SRP's operating history.	See the responses to comments ES-2 and ES-3.
OTHER EXPOSURE PATHWAYS		
ES-5	An estimate of the radiation dose due to other radionuclides and exposure pathways, over the entire operating period, is hardly possible because of insufficient information and missing monitoring data in the 1950s. Moreover, continuous milk sampling did not begin at SRP until 1962. However, during the first years of SRP's operations emissions of radiolodine, tritium, and non-volatile beta emitters were substantially higher than they are today. This led to significant contamination of food products from tritium, strontium-90, cesium-137, and radiolodine. (10). This concludes my comments. Sincerely, Robert Alvarez Director, Nuclear Weapons and Power Project	See the response to comment AB-17 regarding documentation of prior SRP releases and effects.

M-445

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
ENDNOTES:		
	1. Bernd Franke and Robert Alvarez, "Analysis of External Gamma Radiation Monitoring Around the Savannah River Plant," November 1983, Environmental Policy Institute, Washington, D.C. 20003.	
	2. Ibid.	
	3. Elliot Marshall, "New A-Bomb Studies Alter Radiation Estimates," <u>Science</u> , May 1981.	
	4. Edward Radford, <u>Science</u> , August 7, 1981.	
	5. Alice M. Stewart, "Delayed Effects of A-Bomb Radiation," <u>British Journal of Epidemiology and Community Health</u> , June 1982. A. M. Stewart, "Non-Cancer Effects of A-Bomb Radiation," <u>Brit. J. Epid.</u> , in press.	
	6. Committee on the Biological Effects of Ionizing Radiation (BEIR); The Effects of Low Levels of Ionizing Radiations, Washington, D.C., National Academy of Sciences (1972).	
	7. Committee on the Biological Effects of Ionizing Radiation (BEIR); The Effects on Populations from Exposure to Ionizing Radiations," 1980, National Academy Press, Washington, D.C. (1980).	
	8. Karl Z. Morgan, "Risk of Cancer from Low Levels of Exposure to Ionizing Radiation," <u>Bulletin of Atomic Scientists</u> , September 1978.	
	9. Herb Sauer et al., "The Risk of Death in Counties near the Savannah River Plant," (Draft) 19, October 1983, prepared for the E. I. du Pont de Nemours Co. (see Table 3.3).	
	10. Ulrike Dettmer and Bernd Franke, "Analysis of Radiological Monitoring in the Vicinity of the Savannah River Plant, 1955-79, Progress Report," Prepared for the Environmental Policy Institute, Washington, D.C.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

Figure 1. Radiation Background Monitoring Locations

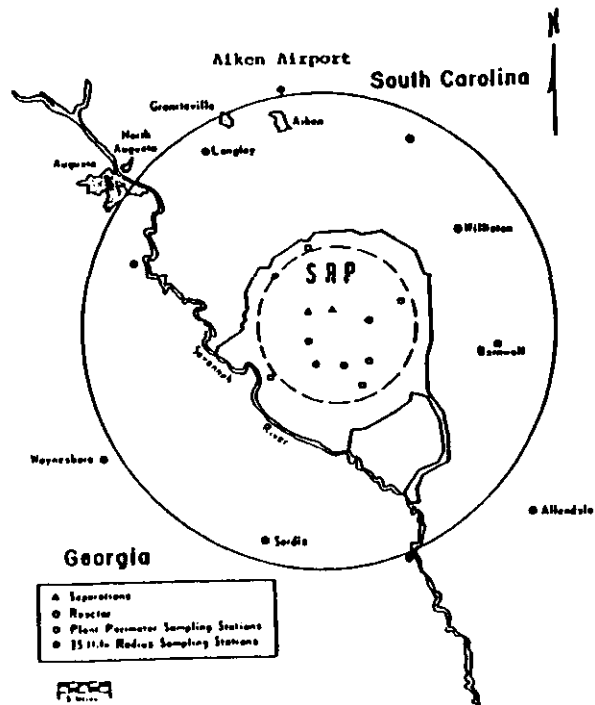


Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

Table 1. List of Locations for External Gamma Radiation Measurements at the Savannah River Plant

<u>REACTOR AREA</u>	<u>SEPARATION AREA</u>
R-Reactor	F-inside
P-Reactor	F-outside (1-mi)
L-Reactor	H-inside
K-Reactor	H-outside (1-mi)
C-Reactor	
<u>PLANT PERIMETER</u>	<u>25 MILE RADIUS</u>
Allendale Gate	Aiken Airport
A-14	Aiken State Park
Barnwell Gate	Allendale
D-area (-400 area)	Augusta
Dark Horse	Barnwell
Dunbarton Fire T.	Bushfield
East Talatha	Highway 301
Green Pond Church	Langley
Highway 21/167	Lees
Jackson	Olar
Military Recr.Site	Perkins
Pattersons Hill	Sardis
Talatha Gate	South Richmond
TC-area	Springfield
West Jackson	Waynesboro
Windsor Road	Williston
Williston Gate	
300/700-area	
<u>100 MILE RADIUS</u>	
Columbia	
Greenville	
Macon	
Savannah	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

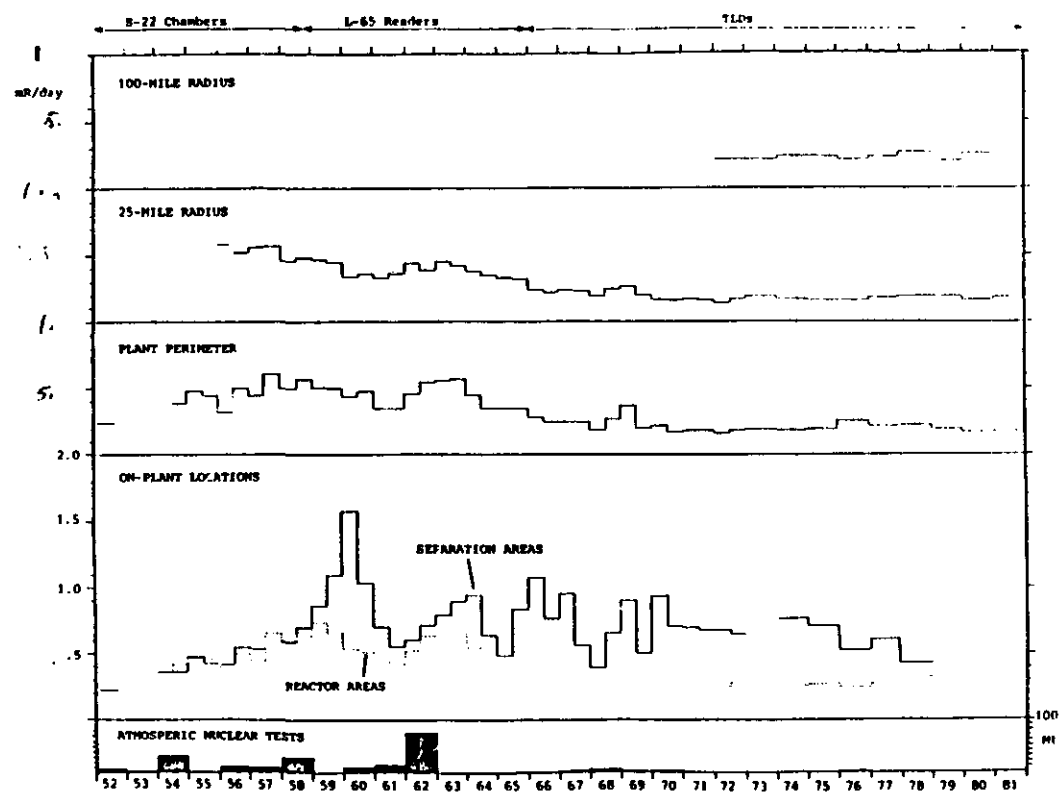
Table 2. Environmental Gamma-Radiation Levels at the SRP Area

Period	Reactor Areas	Separation Areas	Plant Perimeter	25-mile Radius	100-mile Radius	Reference
Feb-Sept 52	0.22	0.22	0.24	--	--	6
Jan-Jun 53	--	--	--	--	--	7
Jul-Dec 53	--	--	--	--	--	7
Jan-Jun 54	0.37	0.37	--	--	--	8
Jul-Dec 54	0.42	0.37	0.39	--	--	9
Jan-Jun 55	0.48	0.47	0.48	--	--	10
Jul-Dec 55	0.46	0.43	0.45	--	--	11
Jan-Jun 56	0.40	0.42	0.37	--	--	12
Jul-Dec 56	0.50	0.55	0.50	0.52	--	13
Jan-Jun 57	0.45	0.54	0.45	0.56	--	14
Jul-Dec 57	0.66	0.66	0.61	0.57	--	15
Jan-Jun 58	0.60	0.59	0.50	0.46	--	16
Jul-Dec 58	0.64	0.71	0.57	0.68	--	17
Jan-Jun 59	0.74	0.67	0.51	0.47	--	18
Jul-Dec 59	0.66	1.10	0.50	0.45	--	19
Jan-Jun 60	0.54	1.58	0.44	0.34	--	20
Jul-Dec 60	0.52	0.94	0.48	0.36	--	21
Jan-Jun 61	0.49	0.71	0.35	0.33	--	22
Jul-Dec 61	0.43	0.56	0.35	0.36	--	23
Jan-Jun 62	0.53	0.61	0.46	0.44	--	24
Jul-Dec 62	0.64	0.72	0.55	0.39	--	25
Jan-Jun 63	0.66	0.80	0.56	0.45	--	26, 29
Jul-Dec 63	0.69	0.90	0.57	0.42	--	29
Jan-Jun 64	0.53	0.95	0.45	0.38	--	40
Jul-Dec 64	--	0.64	0.35	0.35	--	41
Jan-Jun 65	--	0.49	0.35	0.33	--	41
Jul-Dec 65	--	0.84	0.35	0.32	--	42
Jan-Jun 66	--	1.08	0.38	0.34	--	43
Jul-Dec 66	--	0.77	0.28	0.32	--	44
Jan-Jun 67	--	0.96	0.25	0.24	--	45
Jul-Dec 67	--	0.57	0.25	0.23	--	46
Jan-Jun 68	--	0.40	0.19	0.19	--	47
Jul-Dec 68	--	0.66	0.27	0.25	--	48
Jan-Jun 69	--	0.91	0.27	0.27	--	49
Jul-Dec 69	--	0.51	0.20	0.20	--	50
Jan-Jun 70	--	0.94	0.22	0.17	--	51
Jul-Dec 70	--	0.71	0.17	0.16	--	52
Jan-Jun 71	--	0.70	0.18	0.17	--	53
Jul-Dec 71	--	0.68	0.18	0.16	--	54
Jan-Jun 72	0.25	0.68	0.16	0.14	0.21	55
Jul-Dec 72	0.28	0.65	0.18	0.17	0.21	56
Jan-Dec 73	--	--	0.19	0.19	0.21	57
Jan-Dec 74	0.26	0.77	0.18	0.17	0.23	58
Jan-Dec 75	0.27	0.71	0.19	0.16	0.23	59
Jan-Dec 76	0.25	0.53	0.25	0.16	0.21	60
Jan-Dec 77	0.27	0.61	0.21	0.18	0.23	61
Jan-Dec 78	0.32	0.43	0.22	0.19	0.26	62
Jan-Dec 79	--	--	0.19	0.19	0.20	63
Jan-Dec 80	--	--	0.16	0.16	0.25	64
Jan-Dec 81	--	--	0.17	0.18	0.24	65

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

Figure 2. Summary of Gamma-Radiation Measurements at the Savannah River Plant 1952 - 1981.



M-450

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

Figure 3. Gamma-radiation from Deposited Fall-out at Grove, UK from 1951 to 1968; from /72/

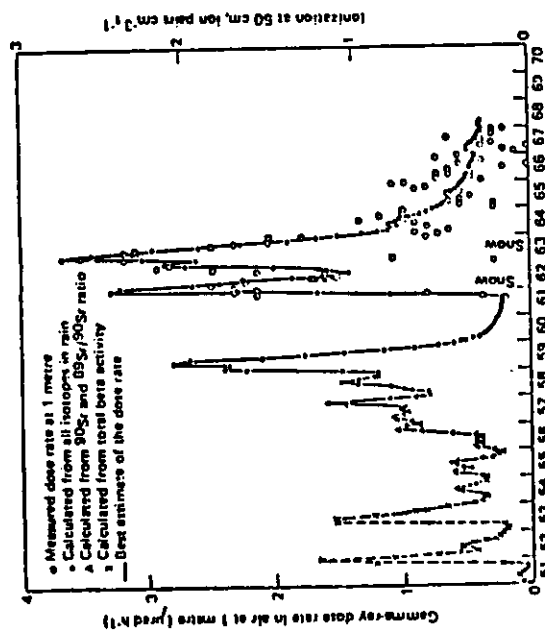


Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

Table 3. External Infinite Gamma-Doses (mrad) Extrapolated from Gunned Film SR-90 Fallout Data /74/

Period	Atlanta, Georgia	Cap Hatteras, N.C.
pre- 1954	3.7	4.8
1954	4.1	3.4
1955	13.2	7.4
1956	8.0	5.5
1957	13.4	11.4
1958	11.9	6.8
1959	13.7	13.1
total	68.0	52.0

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

Table 4. Noble Gas Releases by SRP Operation

Year	^{41}Ar	^{85m}Kr	^{85}Kr	^{87}Kr	^{88}Kr	^{131m}Xe	^{133}Xe	^{133}Xe	^{129}I	^{131}I	P-11
1971	1.4×10^5	3.1×10^3	6.4×10^5	--	1.7×10^3	1.1×10^3	2.5×10^4	2.9×10^3	2.1×10^{-1}	2.7×10^{-1}	46
1972	1.7×10^5	7.3×10^3	6.0×10^5	2.5×10^3	4.2×10^3	2.9×10^2	3.9×10^4	1.1×10^4	2.1×10^{-1}	2.7×10^{-1}	2
1973	1.0×10^5	6.5×10^3	7.7×10^5	2.0×10^3	7.4×10^3	5.1×10^2	2.2×10^4	9.4×10^3	2.1×10^{-1}	1.9×10^{-1}	50/49
1974	1.1×10^5	1.3×10^3	5.0×10^5	6.4×10^2	1.4×10^3	1.4×10^2	5.5×10^3	2.2×10^3	1.7×10^{-1}	1.9×10^{-1}	59
1975	6.5×10^4	3.7×10^2	5.2×10^5	1.2×10^3	0.6×10^3	5.0×10^0	1.1×10^3	7.3×10^2	1.4×10^{-1}	1.2×10^{-1}	60
1976	8.4×10^4	3.0×10^2	7.4×10^5	4.2×10^2	5.1×10^2	6.3×10^2	2.5×10^3	7.3×10^2	1.5×10^{-1}	1.6×10^{-1}	61
1977	6.5×10^4	8.4×10^2	4.4×10^5	6.0×10^2	6.7×10^2	1.2×10^1	2.3×10^3	1.5×10^3	1.4×10^{-1}	6.1×10^{-2}	62
1978	5.3×10^4	8.9×10^2	5.3×10^5	5.6×10^2	0.4×10^3	7.1×10^0	2.2×10^3	1.7×10^3	1.3×10^{-1}	6.5×10^{-2}	63
1979	5.3×10^4	1.0×10^3	4.8×10^5	1.5×10^3	2.3×10^3	9.1×10^0	5.3×10^3	4.5×10^3	1.3×10^{-1}	8.1×10^{-2}	64
1980	7.0×10^4	3.2×10^3	5.8×10^5	2.8×10^3	4.0×10^3	1.9×10^1	7.8×10^3	6.4×10^3	1.6×10^{-1}	2.0×10^{-2}	65
1981	6.2×10^4	1.3×10^3	8.4×10^5	0.7×10^3	1.5×10^3	6.1×10^0	3.9×10^3	2.5×10^3	1.6×10^{-1}	4.7×10^{-2}	66

Remarks: Data on noble gas releases before 1971 is unavailable

* see 1.4×10^5

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

Table 5. Potential Radiation Doses due to Short-Lived Noble Gases Produced at SRP Reactors

Nuclide.	Production rate ¹⁾ per year (Ci)	person-rem per Ci released ²⁾	theoretical ³⁾ population dose for 100% release (person-rem)
Kr-87	4.5×10^{11}	1.1×10^{-4}	5.0×10^7
Kr-88	4.3×10^{11}	4.0×10^{-4}	1.7×10^8
Xe-133	2.1×10^{10}	4.2×10^{-5}	8.8×10^5
Xe-135	3.6×10^{10}	8.7×10^{-5}	3.1×10^6
Total			2.2×10^8

1) 5 reactors with 2,150 MWth and 75% capacity each data from /H1/

2) data from /64/

3) without radioactive decay

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

Table 6. Major Sources of Population Exposure

FROM: Bauer et al., "The Risk of Death in Counties Near the Savannah River Plant" (draft) October 1983. Prepared for E.I. du Pont de Nemours and Co.

Table 6r

Major Sources of Population Exposure

Source of Exposure	Dose to Average Individual, mrem/yr ^a	Population, Dose, man-rem/yr	
		50 Mile Radius	Beaufort and Jasper Counties
Natural Background			
Cosmic Radiation	31.5 ^b		
External (terrestrial) Gamma	33.0 ^b		
Internal (terrestrial)	28.0		
Total	92.5	41625	5550
Medical			
Diagnostic x-rays	77.3 ^c		
Radiopharmaceuticals	13.6 ^c		
Medical and Dental Personnel	0.36 ^c		
Total	91.3	4085	5471
Weapons Test Fallout	4.6	2070	276
Consumer and Industrial Products	4.5	2025	270
Air Travel	0.5 ^c	225	30
Nuclear Facilities (other than SRP)	0.2 ^c (0.0)	90	
Savannah River Plant			
Environmental Radioactivity	0.5 (0.7)	225	42
Occupational Exposure	4.0 (0.0)	1800	
Total	4.5 (0.7)	2025	42
TOTAL	198.1 (194.1)	87145	11646

- a. Values shown generally apply to both the 50-mile radius and the Beaufort-Jasper population groups. Where different, Beaufort-Jasper dose rates are shown in parentheses.
- b. Includes a 10% reduction for cosmic radiation and a 40% reduction for terrestrial radiation to account for shielding by buildings and the body.
- c. Pro-rated over the population.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

Table 7. Potential Natural and Radiation-Induced Fatal Cancers within a 50-Mile Radius of SRP

Average Annual Fatal Cancers per Year	Lower Risk (a)	Higher Risk (b)
Natural Occurrence (c)	594	594
<u>Radiation-Induced</u>		
Fallout and/or SRP 170,000 person-rem (d)	4.3	88
Fallout and/or SRP 280,000 person-rem (d)	7.5	145
<u>Percentage of Natural Occurrence</u>		
SRP and/or fallout 170,000 person-rem	0.7%	15%
SRP and/or fallout 280,000 person-rem	1%	24%

(a) Based on the BEIR I probability of 360×10^{-6} cancers per rem.

(b) Based on the Hanford Survey of Mammary, Stewart and Kneale as interpreted by Morgan in the Bulletin of Atomic Scientists, Sep. 1978 (7000×10^{-6} cancers per rem).

(c) Based on 1959-78 average annual cancer death rates for South Carolina and Georgia estimated by Bauer et al. for E.I. du Pont de Nemours Co., Oct. 19, 1983, (Draft).

(d) Based on environmental measurements collected by SRP.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF CAROLINE O'ROURKE		
433-A Howie Ave. Charleston, SC 29412 November 13, 1983		
Mr. Melvin Sires U.S. Dept. of Energy Savannah River Operations Office P.O. Box A Aiken, South Carolina 29801		
Dear Mr. Sires:		
ET-1	I am opposed to the opening of the L-Reactor of the Savannah River Plant for several reasons. Generally, the reopening would result in an increase of high level nuclear waste in the area, particularly into underground aquifers. Also, there likely would be run-off of radioactive cesium into the Savannah River. Lastly, when the extremely hot water from the reactor operation is discharged into the river, there would be localized die-off of endemic flora and fauna.	See the response to comment BA-5 regarding high-level radioactive waste, the responses to comments AA-2 and BT-2 regarding radiocesium, and the response to comment AB-13 regarding information contained in this EIS regarding cooling-water mitigation alternatives.
Please take these comments into consideration.		
Sincerely yours,		
Caroline O'Rourke		

M-457

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF D.M. McEACHIN, JR.		
House of Representatives State of South Carolina 314-A Blatt Building Columbia, S.C. 29211 November 14, 1983		
D.M. McEachin, Jr. District No. 63-Florence County Drawer 150 Florence, S.C. 29503		
Committee: Ways and Means		
Mr. Melvin J. Sires, III U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801		
ATTN: EJS for L-Reactor		
Dear Mr. Sires:		
As a boy growing up in South Carolina, I would hear accounts of how the air and water were polluted in the North. I was also told how fortunate I was to live in South Carolina. I realize that South Carolina industrialization has engendered wastes that are toxic to the environment. The consternation over the destruction to our environment has been slow coming in South Carolina but it has arrived.		
The consequences to the environment of the start-up of the L-Reactor is like a fireball in the night to many South Carolinians of all walks of life.		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EU-1	I implore you to comply with federal and South Carolina environmental standards applicable to commercial reactor sites. Good citizenship requires that all steps be taken to avoid damage to the environment before start-up.	Chapter 7 of the EIS presents the Federal and state environmental protection regulations that are applicable to the restart of L-Reactor. The restart of L-Reactor will comply with all of these regulations. For example, the proposed restart of L-Reactor will be in compliance with an NPDES permit issued by the State of South Carolina, and the restart of L-Reactor will be in compliance with DOE radiation protection standards that are comparable to those of the Nuclear Regulatory Commission (10 CFR 20) for a production facility (i.e., 500 millirem to the whole body in anyone calendar year). With respect to engineered safety features such as a containment dome, the need for specific engineered safety features is based upon limiting potential radiological consequences. The potential radiological consequences are related to the design and operation of the specific type of reactor being considered; for example, the Fort St. Vrain reactor, which is a gas-cooled commercial reactor in Colorado, has no containment dome and was licensed for operation by the NRC.
	With kind regards, I am,	
	Yours very truly,	
	D.M. McEachin, Jr.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
COMMENTS ON APPENDIX D OF THE DEPARTMENT OF ENERGY'S DRAFT ENVIRONMENTAL IMPACT STATEMENT: L-REACTOR OPERATION AT THE SAVANNAH RIVER PLANT By JOHN M. CROOM QUANTITATIVE APPLICATIONS Environmental and Statistical Sciences 1000 Montreal Road, 55A Clarkston, Georgia 30021 November 9, 1983 Prepared for: Energy Research Foundation 2530 Devine Street Columbia, SC 29205		
	1. P. D-4, Section D.2.1.1, first full paragraph:	
EV-1	(a) Listing of mechanisms of association between Cs-137 and sediments implies ranking of importance. Data are available from Fig. D-2: Graphs A, B, and C to test the correlation between cation exchange capacity (CEC) in C and %'s clay and organic material in A and B respectively. Analyze with regression or correlation (as per their inherent assumptions) and present proportions of CEC sum of squares attributable to clay and OM.	There was no intent to imply any ranking to the importance of the mechanisms of association between cesium-137 and the sediments of Steel Creek.
EV-2	(b) Reference to Kiser (1979) and Prout (1958) concerning "affinity of Cs-137 for... and suspended solids" is contradictory to last two sentences in paragraph two of page 3-66 and the last two sentences in the first paragraph on P. D-21. Which is correct?	The Kiser (1979) and Prout (1958) studies are not contradictory with the last two sentences in paragraph 2 of page 3-66 of the Draft EIS. The Kiser and Prout studies were considered to show the affinity (K_d) of cesium -137 had for the sediments or suspended solids. The sentences in questions refer to transport modes (dissolved versus suspended). At low suspended solids concentrations, the dissolved fraction will carry more cesium-137 than the suspended solid. This is not contradictory to the K_d concept.

M-460

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	2. P. D-6, Table D-2:	
EV-3	Sum of "Percentage of total Cs-137 inventory in interval" equals 99, not 100. Is difference due to rounding?	The difference is due to rounding.
	3. P. D-8, Table D-3 and references to it on P. D-8, first full paragraph:	
EV-4	(a) Units of radioactivity concentration appear to be incorrect. How do changes affect subsequent impact estimates and conclusions?	Units presented in Table D-3 (D-8) are indeed incorrect and should be microcuries per square meter. This is an undetected typographical error and does not affect subsequent estimates of impact. Transport estimates were derived independently of inventory estimates.
EV-5	(b) In column "Total Curies" provide error estimates so that readers can evaluate precision of presented distribution.	Inventory estimates were made using three different techniques based on stratified random sampling, aerial gamma spectroscopy, and a "weighted" analysis of radiocesium contents (microcuries per square meter) of individual soil cores. Error estimates could be calculated only for the stratified random sampling estimate: 56.89 ± 8.86 Ci (± 95 percent confidence limit). This estimate provided the lowest estimate (mean) of the radiocesium inventory. The highest inventory estimate was derived from the "weighted" soil core analysis (67.09 Ci). This highest estimate was used as the inventory in Steel Creek. Greater detail on these analyses is presented in Smith et al., 1982, Chapter VI).
	4. P. D-6, last sentence and its continuation on P. D-8 with reference to Table D-6:	
EV-6	Statement is true for only 4 of 7 comparisons; the average difference is less than 7. How does this change in the Co/Cs ratio affect subsequent sections involving Co inventories and concentrations based on Co/Cs ratios?	The statement in question has been revised in the EIS to reflect the mean factor of 15.15, which is based on the mean Co-60/Cs-137 ratio. The seventh point is an outlier and therefore was not included in the calculations. As noted in Section 4.1.2.4, Co-60 contributes very little to the dose to the hypothetically maximally exposed individual. Cobalt-60 contributes less than 1.0 percent to this dose even though the calculated transport ratio (Co-60/Cs-137) for the first year is about 0.06. Thus, small errors in estimating the concentration of Co-60 released to the Savannah River will have minute effects on the calculated dose.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
5. P. D-8, Table D-6:		
EV-7	How was outlier in footnote b. identified? Include method reference and parameters for outlier identification and justify testing for outlier occurrence.	Although the ratio (Co-60/Cs-137) of 0.6 could be identified statistically as an outlier, it is unlikely that such a high ratio could exist at the present time in the Steel Creek swamp system. A high ratio is unlikely on the basis of the radioactively decayed release data which provides a ratio of about 0.015. In addition, the isopleths of exposure rate for Co-60 and Cs-137 do not support a high concentration ratio (Boyns and Smith, 1982; EGG Report 1183-1816, "An Aerial Radiological Survey of the Savannah River Plant and Surrounding Area, Aiken, South Carolina").
EV-8	Value 0.119 is incorrect. What are triple hyphens in columns 5 and 7?	Table D-6 of the EIS has been corrected to reflect the correct value, 0.112 versus 0.119. The hyphens are used to indicate the radioactivity was below the limit of detection.
6. P. D-8, first full paragraph, lines 8-12.		
EV-9	Provide statistics supporting these statements including level of confidence.	Throughout the Steel Creek system (corridor and delta), 45 percent of the variation in gamma exposure rates [1 m (mR/hr)] was explained using multiple regression techniques (error df = 79). Surface-soil radiocesium content [0.1 m ³ (1 m ² area x 0.1 m depth)] alone explained 36.9 percent of the variation. Woody plant species leaf Cs-137 concentrations and subsurface-soil texture were also significant (p<0.10) variables in the regression but explained relatively little of the variation (<3%) in exposure rates. When regressions were performed using data from individual stream sections, however, r^2 values ranged from 0.35 to 0.82.
7. P. D-11, Table D-4:		
EV-10	(a) Provide data for sediment densities so that "Total Curies" in Table D-3 can be verified.	Soil bulk density values were extremely heterogeneous throughout Steel Creek. Average surface soil (0-10 cm) bulk densities (g-dry/cm ³) ranged from 1.43 to 0.48 at different sampling locations along the stream floodplain while subsurface (10-20 cm) soil bulk density averaged from 2.01 to 0.57 at different locations.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EV-11	(b) Footnotes a. and c. appear contradictory, i.e., N versus "composite"; provide explanation.	Rather than a composite sample, the table was derived from data for all samples collected at the 12 locations. Footnote "a" has been reworded to reflect this.
	8. P. D-11, Tables D-4 and D-5:	
EV-12	Footnotes b. in both tables ask the reader to accept that visual inspection can objectively and numerically with precision, distinguish between particles sized 0.05-0.002 mm (silt) and less than 0.002 mm (clay). I do not accept "visual inspection" as a precise method. Provide quality control data to standardize differences between observers and demonstrate observer accuracy and precision.	While visual classification of soils is not a substitute for grain-size analyses, visual classifications do provide a valid means for characterizing the soils of the Steel Creek corridor. Visual classifications are often performed in the field by soil scientists and engineers. Standard grain-size analyses are being performed and the results are being evaluated in relation to cesium concentrations.
	9. P. D-12, Table D-7:	
EV-13	Number of observations do not total to 1851.	Table D-7 in the Draft EIS contained two typographical errors. The number of observations at location 10 is 60 rather than 10 and the number of observations at location 110 is 138 rather than 135. These changes have been made in the EIS.
	10. P. D-13, Section D.2.1.2, second and last sentences:	
EV-14	The second sentence states "no significant change" whereas the last sentence shows a 52% decline between 1974 and 1977, which I regard as significant. What is the purpose of the apology in this paragraph?	The "no significant change" refers to cesium-137 concentrations in the sediments observed in 1976 and 1977; these concentrations averaged 34.1 ± 50.3 picocuries per gram in 1976 and 39.9 ± 57.4 picocuries per gram in 1977. Based on these data, the sediment sampling interval in Creek Plantation Swamp was changed to once every five years, and the use of TLDs on a yearly basis. There is a change of 52 percent in the 1974 and 1977 data.
	11. P. D-13, Section D.2.1.3, first two sentences:	
EV-15	These two sentences are contradictory. Which is correct?	The two sentences are not contradictory; the first is a general statement most applicable to the main channel and the second sentence provides exceptions to the general statement.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
12. P. 15, Table D-8:		
EV-16	What is meant by hyphens in data columns?	The hyphens mean no analyses were performed; this table has been revised to include more recent monitoring data.
13. P. D-15, Table D-9:		
EV-17	Only the last two numbers in Column 3 (Cs-137) and the next to last number in column 4 (K-40) are significantly different ($p = 0.05$) from zero. Comparisons of these data in Section D.2.1.4 are misleading because of zero inclusion in confidence interval and should be corrected.	The data in Table D-9 of the Draft EIS were provided to characterize the concentrations of cesium-137 and potassium-40 in sediments at the two water treatment plants. These concentrations are at or near the limit of detection. The comparisons are not misleading for the reader has access to Table D-9.
14. P. D-16, Section D.2.2, first full paragraph on P. D-16 and referenced Table D-10:		
EV-18	(a) What types of vegetation (leaves, branches, etc.), and what species are included in these samples?	The vegetation along the Steel Creek corridor included emergent type vegetation that grow in the shallow inundated portion of the creek. This vegetation included cattails, knot weed, duck weed, etc.
EV-19	(b) These data are amenable to analysis of variance which would provide confidence to conclusions drawn from this analysis. As presented now, I cannot accept that 1973 is statistically less than 1972 as stated and likewise 1972 from 1971; there appears to be sufficient within year variation so that between year differences may be difficult to demonstrate.	Statements made in Section D.2.2 concerning Table D-10 of the Draft EIS do not require judgments about absolute differences between years, just general trends. It is noted however that the slope of the time trend for sample point 9 is not statistically different from zero. From 1970-1973 all sample points except 9 and 4 show decreasing concentrations with time; after 1970 the concentrations decrease with time at sample point 4. As noted in the text, all sample points from 1973-1976 exhibit concentrations that do not change appreciably with time. However, the 1977 sample points all have cesium-137 concentrations that are greater than their corresponding 1975 and 1976 sampling points, with the exception that sample point 6 in 1976 had a higher concentration than in 1977. Many of the 1977 concentration data are greater than their corresponding 1975 points by a factor of 2 or more.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EV-20	(c) At minimum, error terms should be included with "Averages" to allow reader to decide if stated between year differences are accurate.	This suggestion has been adopted in the EIS.
EV-21	(d) Arithmetic calculations of "Averages" should be verified; four out of five checked were incorrect.	The arithmetic calculations have been checked and errors corrected in the EIS.
EV-22	(e) Smith et al. (1981) data for 1981 should be included in Table D-10 as it appears to be available; likewise for 1980 data if it is available.	Data compiled by Smith et al. (1982) are not comparable on a one-by-one basis with the data presented in Table D-10 because their locations are not identical and their methodologies differ from that used to develop Table D-10. However, results of their studies have been summarized in Appendix D of this Final EIS.
EV-23	15. P. D-16, Section D.2.2, second full paragraph on P. D-16: This paragraph should be rewritten to clarify what is being compared; "generally less" must be supported by statistics or defined.	The text of Section D.2.2 has been revised to reflect the concern expressed by this comment.
EV-24	16. P. D-16, Section D.2.2, third and fourth full paragraphs on P. D-16: (a) What tissues (or whole body?) are being discussed for deer and hogs?	Muscle tissue (edible portions) of hogs and deer were measured for cesium-137 concentrations.
EV-25	(b) Provide error estimates where concentrations are means to allow reader to decide if differences exist.	Information from a recent study on the cesium-137 concentrations in deer from SRP and the South Carolina Coastal Plain is presented in Section D.2.2 of the EIS.
EV-26	17. P. D-18, Section D.2.2, first paragraph on P. D-18 and referenced Table D-12: (a) Justify selection of the "fish flesh bioaccumulation factor" of 3000. Arithmetic weighted average $\pm$ standard deviation of data in D-12 is 2746 ± 1833 ; perhaps a factor of 4579 (mean + standard deviation) would be more conservative in the sense that a factor considerably above average is used in computing potential human health impact.	The EPA notes in comment DA-21 that the use of 3000 for the bioaccumulation in the EIS dose assessments probably overestimates the cesium-137 in fish; they indicate that values of 40 to 1300 for freshwater fish are generally used in dose assessments. The NRC computer code LADTAP-11 uses a default cesium-137 bioaccumulation factor of 2000. The choice of 3000 for use in this EIS is reasonably conservative because it is (1) more than twice that considered adequate by EPA; (2) 1.5 times that normally used in safety analyses; (3) nearly 1.5 times the mean of 527 specimens (2019) obtained from Steel Creek below Road A.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EV-27	(b) What human doses would result from model runs with the bioaccumulation factor of fish equal to 4579?	If the bioaccumulation factor for freshwater fish were 4579, the dose to the hypothetical maximally exposed individual would be 5.3 millirem during the first year after resumed operation, using the same assumptions used to calculate this dose with a 3000 bioaccumulation factor. The use of a bioaccumulation factor above 3000 is unwarranted.
EV-28	(c) Exponential transformation (cited in Table D-12, footnote d.) is applied because of distributional properties of data and not simply because they "vary widely." Support the use of exponential transformation or use arithmetic calculation.	The geometric mean should be used when the bioaccumulation data are lognormal. As the distribution of the data is unknown the arithmetic mean is provided.
	18. Table D-11:	
EV-29	Provide estimates of error associated with mean concentrations to allow reader decision of differences between means.	Standard error data are presented in Table 1 of Ribble and Smith (1983). To convert cesium-137 concentrations in dry weight to concentrations in wet weight, divide by 5.
	19. P. D-18 and D-21, Section D.2.3.1, first two paragraphs:	
EV-30	Provide 1982 data comparable to "November and December" 1981 data with associated error estimates.	No data measurements were made in November and December 1982. The mean cesium-137 concentration in the seven water samples from Steel Creek was 5.31 ± 1.81 (2 standard errors) picocuries per liter.
	20. P. D-21, Section D.2.3.1, first full paragraph on P. D-21:	
EV-31	Since this ratioing estimate of Co-60 concentrations is used several times in Appendix D, a brief description along with error estimates would be very helpful to the reader and would strengthen confidence in estimates of Co-60 concentrations.	Of the approximately 250 samples analyzed in the Spring 1982 cesium-137 transport study, Co-60 was detected in only 4 suspended solids samples and was below the limit of detection (0.2 picocurie per liter) in all of the soluble fractions. Therefore the procedure followed by Hayes and Watts (1983; DPST-83-673) was used to estimate the concentration of Co-60. It is noted that Co-60 contributes very little to the dose to the hypothetically maximally exposed individual, less than 1.0 percent (Section 4.1.2.4). Thus, small errors in estimating the concentration of Co-60 released to the Savannah River will have minute effects on the calculated dose.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
21. P. D-23, Section D.2.3.3, first and fourth full paragraphs on P. D-23 and Table D-14:		
EV-32	(a) Demonstrate and provide supporting statistics that 0.033 pCi/l is higher than 0.028 pCi/l.	There is no statistical difference between 0.033 and 0.028 pCi/l.
EV-33	(b) Recent measurements of finished water at Beaufort-Jasper (0.028 pCi/l of Cs-137) and Cherokee Hill (0.033 pCi/l of Cs-137) demonstrate a much smaller reduction in finished water concentrations of Cs-137 than originally estimated by 1965 studies. The latest Steel Creek Cs-137 concentration available in the DEIS is for 1981 (5.30 pCi/l) which results in a predicted Cs-137 concentration of 0.04 pCi/l at Highway 301 (See Table D-17). From 0.04 pCi/l at Highway 301, finished water at Beaufort-Jasper and Cherokee Hill contain 0.028 pCi/l of Cs-137 (a reduction of 30% rather than 79.3% as in Table D-14) and 0.033 pCi/l of Cs-137 (a reduction of 18% rather than 97.5% as in Table D-14), respectively. Please respond to this interpretation of data presented in Section D.2.2.3.	The cesium-137 measurements made during Spring 1983 at the two water treatment plants were part of the initial phases of a monitoring program that has been established prior to the restart of L-Reactor. This program, which uses specialized sampling and analytic techniques, will be extended to monitor the finished water from these plants following the restart of L-Reactor as well as Savannah River water at several locations (Section 6.2.4). The analysis proposed by the commentor is flawed because it is not based on synchronous measurements at the locations needed to establish the appropriate reduction factors. The 0.04 pCi/l value used in Table D-17 of the DEIS represents the average conditions at the Highway 301 bridge for the 1979 to 1982 period (see footnote "b" of the table). No special measurements were made at the 301 bridge during the period of the special finished water monitoring study. On the other hand, the reduction factors calculated by Hayes and Boni (1983) and presented in the Table D-14 of the DEIS are based on synchronous measurements at the different locations. The ongoing measurements at the Beaufort-Jasper and Cherokee Hill water-treatment plants are being supplemented by measurements upriver and downriver from SRP and by measurements of the raw water being treated by these plants. When these measurements are completed, a thorough evaluation of the river-related reduction factors and treatment plant removal factor will be made.
22. P. D-24, Table D-14:		
EV-34	Are all of these data from 1965 sampling and if so were they taken in the same time period?	As noted in Hayes and Boni (1983; DPST-82-1077), all data were obtained 10-17 December 1965.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
23. P. D-26, Section D.3.5:		
EV-35	Does the estimate of 0.4 Ci of Cs-137 in vegetation include roots or is it above-ground vegetation?	The transport during the first year attributable to biotic transport is based on a surficial biomass inventory of 304 grams per square meter. Based on Tables D-3 and D-10 of the Draft EIS and the biomass estimate of 304 grams per square meter, the transport estimate is about 0.13 curie, some 3 times less than the 0.4 curie used in the total transport estimate of 4.4 ± 2.2 curies during the first year.
24. P. D-26, Section D.3.6:		
EV-36	Are these estimates of volume and travel time consistent with the hypothesis in the third full paragraph on P. D-32 where a four day "lag" was proposed to link highest flow in March 1982 with highest concentrations per liter of Cs-137; explain and clarify?	Yes, the information provided in Section D-3.6 is based on current flow conditions which do not normally reach the creek floodplain except during periods of high runoff. It is noted that the concentration of cesium-137 in the creekbed sediments are typically much less than in the sediments of the creek floodplain.
25. P. D-27, Section D.3.8:		
EV-37	Which of these estimates of Co-60 inventory is considered best?	No preference is assigned to either inventory estimate. These estimates are meant to characterize the environment. Calculations of cobalt-60 resulting from the restart of L-Reactor were made independent of any inventory of cobalt-60 in Steel Creek.
26. P. D-29, Section D.4.1, first paragraph on P. D-29 and referenced Figure D-10:		
EV-38	Why was change in flow not considered in modeling Cs-137 leaching from sediments? Flow and temperature must interact otherwise Section D.4.3 has no purpose in face of an $r^2 = .88$ (square of the correlation coefficient). Elaborate on how experiment was structured including monitoring of effluent temperature and flow in Steel Creek.	There is nothing to show that more leaching (higher Cs-137 concentrations) would occur from higher water flow rates. The rather flat profiles of the floodplain would indicate that higher flows would decrease the Cs-137 concentrations in water because of an increase in the water volume to floodplain area ratio. In the absence of data on continued high water-temperature flow in Steel Creek, it was assumed that the Cs-137 concentration would follow the measured concentrations at the Cypress Bridge location. Laboratory studies on Cs-137 extraction by hot water would indicate that about 5 percent could be extracted. The laboratory conditions of vigorous stirring of sediment would not be duplicated in the Steel Creek environment.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		The calculations were based on environmental monitoring data on Cs-137 concentrations (weekly composites) at Cypress Bridge. The outlet temperatures from SRP reactors (during operation) are relatively constant (typically about 70°C) and flows were measured by a USGS gauging station at Cypress Bridge. [Also see the description of June 1976 study of hot water flows from P-Reactor (Du Pont, 1982; DPST-81-241)]. The correlation coefficient of 0.94 ($r^2 = 0.88$) was developed for equation fit to the data developed from the June 1976 studies (Figure D-10 of the Draft EIS).
27.	P. D-29, Section D.4.1, second sentence of second paragraph and associated, although not referenced, Table D-15:	
EV-39	Regression analysis of data in Table 15 probably would not support a slope significantly different from zero as purported in the text sentence.	The desorbed fraction as given in Table D-15 of the Draft EIS, is a combination of the dissolved fraction and the amount left in suspension after centrifugation for one-hour. The dissolved fraction represented 49.9 percent at 70°C; 30.8 percent at 52°C; 16.7 percent at 43°C and 3.8 percent at 22°C of the total, desorbed activity. These data showed that the higher temperature extracted more dissolved Cs-137 than the lower temperatures.
28.	P. D-29, Section D.4.1, third paragraph (one sentence):	
EV-40	What are "these analyses"? There has been nothing presented to indicate how the desorption estimate of 1.7 Ci of Cs-137 was calculated. Desorption is a critical issue and must be substantiated.	The Cs-137 concentration data at Cypress Bridge were fit with an exponential representation of the data, integrated and a full flow of 1.1×10^6 m ³ /day was used to estimate the 1.7 Ci/year (Du Pont 1982; DPST--81-241): Total Ci = $1.7 [e^{-0.026563t_1} - e^{-0.026563t_2}]$ where t = days.
29.	P. D-31, Section D.4.3.1, first paragraph, line 8:	
EV-41	How was the "20-percent-per-year decrease" estimated? On P. D-35, first paragraph, line 6 of Section D.4.4, it is stated that "a 20 percent reduction in transport is assumed." Support this assumption.	The assumed reduction in transport in the third and subsequent years of 20-percent decrease per year is based on engineering judgment.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	30. P. D-32, Section D.4.3.1, full paragraphs 1, 2, 3, and 4, Table D-16, and Figure D-11:	
EV-42	(a) Collection of data at Cypress Bridge (flow) and at the mouth of Steel Creek (Cs-137/I) appear to obviate calculation of Cs-137 transport because nothing is known about flow rates in Pen Branch which joins Steel Creek between its mouth and Cypress Bridge. In the presented analysis, Pen Branch is assumed to flow at a constant 12.7 m ³ /sec (greater than ten times the flow in Steel Creek). In late winter-early spring, there is heavy rainfall in the piedmont-coastal plain of South Carolina resulting in large fluctuations of creek flows. It is not surprising that there is no significant correlation between the Cs-137 transport (mCi/day) and flow (m ³ /day) since fluctuating dilution by Pen Branch cannot be factored out of the variation between transport and flow in Table D-16 and Figure D-11.	K-Area discharges cooling water to Pen Branch at a rate of about 11 m ³ /sec during operation of the reactor, and at about 2.5 m ³ /sec when the reactor is not operating. These discharges dominate any natural flow that may be present in Pen Branch (estimated to be 1.7 m ³ /sec). The flow from K-Area is relatively constant (12.7 m ³ /sec) most of the year and combines with Steel Creek flow in the swamp below the Steel Creek delta (see Figure D-1). Pen Branch is not expected to contribute to the remobilization of cesium-137 in the Steel Creek system.
EV-43	(b) How is similarity between March 21-28, 1982 and resumed L-Reactor operation shown in Figure D-11 and Table D-16? Flow during March 21-28, 1982 is not significantly different (p = 0.05) from the previous 8-day period (March 13-20, 1982).	The flow during the period of March 21-28, 1982, is not significantly different from the that of the previous week. The concentration of Cs-137 is relatively constant (within counting error) over the period shown in Table D-16. However, the March 21-28, 1982, data resulted in a higher estimate of Cs-137 transport which was used in the final estimation.
EV-44	(c) The third and fourth full paragraphs on P. D-32 are not supportable in light of comments 31a and 31b above. Also, present the hydraulic model of Steel Creek that demonstrates that flow rate and rate of erosion are linearly related as purported in the calculation of Cs-137 transport in the fourth full paragraph on P. D-32.	There is no data to date on suspended solids concentration in onsite streams to indicate other than a simple linear hypothesis would be applicable. The lower part of the streams are a depositing rather than an eroding environment (Ruby et al., 1981). The cesium-137 released to Steel Creek was transported and deposited under flow conditions that are expected to be similar to those when L-Reactor operation resumed, about 11 cubic meters per second. Steel Creek has received thermal discharges up to 22 cubic meters per second (1961-1963) and thermal discharges of about 11 cubic meters per second until L-Reactor was placed in standby status in 1968 (Section 3.4.1.2).

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
31. P. D-36, Table D-17, Footnotes a and b:		
EV-45	Provide all reduction factors and flow rates in one table. I could not find values for flow at (1) Steel Creek mouth, and (2) Savannah River at 1.5 river miles below Steel Creek. Also, I could not determine factor relating current inventory transported values between Steel Creek mouth and Savannah River at 1.5 miles below Steel Creek.	As noted in Section 3.4, the flow in Steel Creek at Cypress Bridge is about 1.5 cubic meters per second. The direct discharge of L-Reactor cooling water to Steel Creek will increase this flow by about 11 cubic meters per second (Section 4.1.1.2). Thus, the total flow across the delta (with L-Reactor up) will be about 12.5 cubic meters per second. Contributors of flow from the swamp and Pen Branch enter Steel Creek below the delta and are not expected to contribute to the remobilization of cesium-137 and cobalt-60 in the Steel Creek system. The physiography of the Savannah River 1.5 river miles downstream from the creek mouth greatly promotes mixing of the river water (Section 4.1.1.4). The decrease in concentration of cesium-137 between the mouth of Steel Creek and the Savannah River, 1.5 river miles downstream from the mouth, is based on changes in the flow regime in Steel Creek (3.95×10^{11} liters per year) and that of the river (9.31×10^{12} liters per year). Between SRP and the Highway 301 bridge, the flow of the Savannah River increases on the average by at least 6 percent. The decrease in cesium-137 concentrations in the Savannah River between the Highway 301 and 17 bridges is based on the DEIS Table D-14 (Hayes and Boni, 1983; DPST-82-1077).
32. Appendix D and Figure D-9: Comment on the relative error of impact estimates and probable direction of the error.		
EV-46	Where error estimates were presented for data in the data chain culminating in impact estimates, relative error was calculated as the standard deviation divided by its mean; this statistic is the coefficient of variation. For seven sets of data in the impact estimate data chain, the average unweighted coefficient of variation was 36.3%. Assuming that impact estimates are from a normally distributed population, the 95% confidence interval ($\pm$) about any specific estimate of impact would be plus or minus 60% of the value ascribed to the impact estimate. For example, if an impact estimate equaled 10, the 95% confidence interval ($\pm$) would be from 4 to 16. That is, one can expect, by chance, that the estimate of impact will be a value less than 4 or	Inventory estimates for cesium-137 and cobalt-60 remaining in Steel Creek and the offsite Creek Plantation swamp are presented in Section D.3. This information is used in the environmental characterization provided in Section 3.7.2. The transport calculations were made independently of the inventory estimates. The magnitude of the inventory did not enter in the transport calculations.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	greater than 16 five times out of one-hundred. In the portion of the L-Reactor radiological impact estimate presented in Appendix D, the direction of the impact estimate error will probably be to the plus side. This judgment is based on the fact that 55 of the 198 curies of Cs-137 (28%) located in the Savannah River watershed below L-Reactor cannot be accounted for so that estimates of curies of Cs-137 located in areas of the watershed are most probably biased low. If more than 198 curies could be accounted for, the judgment would be that the estimates were biased high. In conclusion, whatever the impact estimate (e.g., Cs-137 concentration of Cs-137 inventory), the actual value is probably greater than the estimated value.	
33. PP. D-27 through D-37, Section D.4: Comment on Section D-4 "Remobilization of Radiocesium and Radiocobalt" wherein an alternative model is presented.		
EV-47	Critical parameters of the model in Section D.4 are (1) radionuclide desorption by hot water from sediments and (2) radionuclide-in-sediments movement by erosion-transport by dramatically increased water flow in Steel Creek. Parameter estimates presented in Section D.4.4 were demonstrated to be based on insufficient data (Comments 27 and 28 [desorption] and Comment 31 [erosion-transport]) and are therefore questionable. There are no additional data presented from which alternative parameter estimates can be made, so a logical model is the sole basis from which radionuclide-sediment remobilization may be estimated. It is given that hot water and higher flow are expected to remobilize radiocesium and radiocobalt in Steel Creek and move them into the Savannah River. It is intuitive that remobilization in the first year will be greater than 0% but less than 100% of the	To support an estimate of 29 Ci discharged to the Savannah River the first year of L-Reactor operation would require the transport of large amounts of sediment. Greater than 95 percent of the Cs-137 in the Steel Creek system is located in the sediments in floodplain. The average concentration of Cs-137 in these sediments is estimated to be less than 125 pCi/g in the upper 10 cm of sediment. The amount of sediment containing this Cs-137 concentration would be greater than $(57.9 \text{ Ci} \times 1 \times 10^{12} \text{ pCi/g} / 125 \text{ pCi/g}) 4.6 \times 10^{11} \text{ g}$. If 29 curies of Cs-137 were to be remobilized during the first year after restart, greater than $2.2 \times 10^{11} \text{ g}$ would have to be moved at suspended sediment levels of more than 550 mg/l across Steel Creek delta. These suspended sediments would have to be sustained for a year. Suspended sediment concentration data do not support a sustained suspended solids concentration of 550 mg/l or short duration suspended loads of higher magnitude in South Carolina Coastal Plain streams.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
M-473	radionuclide inventories in Steel Creek sediments. The least biased estimate of radionuclide remobilization in the first year is the midpoint of the range of possibilities, in this case 50%. Remobilization in subsequent years can be shown by the same argument to again be 50% of what remains. That is, 29 curies of Cs-137 (50% of the 57.9 curies in Steel Creek sediments) are remobilized in the first year of L-Reactor reoperation, leaving 29 curies still in Steel Creek sediments. In the second year, 14.5 curies of Cs-137 (50% of the remaining 29 curies) are remobilized leaving 14.5 curies. Each subsequent year, 50% of radiocesium (and radiocobalt) are transported from Steel Creek to the Savannah River. Assuming that Cs-137 in vegetation (0.4 curie [Section D.4.2]) is transported to the Savannah River in the first year (as assumed in Section D.4.2) the total first year input would be 29.4 curies of Cs-137. The second year input would be 14.5 curies and in the tenth year only 0.1 curie would be transported from Steel Creek to the Savannah River; cumulative Cs-137 transport (including Cs-137 in vegetation in the first year) will have been 58.2 curies. Impacts on finished water at Beaufort-Jasper and Cherokee Hill are greater due not only to an alternative model but also to reestimation of reduction factors between Highway 301 and the two-water treatment facilities (refer to comment 22b). Reestimated reduction factors for Beaufort-Jasper and Cherokee Hill are 18% and 30% respectively. Impacts to water quality (natural and finished water) due to the alternative model and reestimation of reduction factors associated with water treatment facilities are provided in a revised Table D-17 from the DEIS. Table format and assumptions in footnotes are unchanged; only Cs-137 inventories and concentrations are different. The resulting impacts in the first year of L-Reactor reoperation to finished water at Beaufort-Jasper and Cherokee Hill are 203 and 36 times greater under this analysis than under the analysis presented in the DEIS for L-Reactor.	Appendix D has been updated to include results of radiocesium monitoring in Steel Creek during the 18 week period from April through August, 1983. These results support the sediment-water transport estimate of 2.3 ± 1.8 curies per year during the first two years; they do not support the contention that transport should be 29 ci during the first year.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EV-48	What are resulting doses to humans from revised water quality impacts presented above and in Comment 18. To summarize, analysis of data employed in the draft Environmental Impact Statement for L-Reactor (SRP) (Sect. D-4) to estimate parameters demonstrates that (1) data are insufficient to support parameter calculations, or (2) alternative calculations resulting in much higher impact estimates are as defensible as impact estimates presented in the DEIS. As a result, I have no confidence in DEIS conclusions concerning movement of radionuclides now in Steel Creek into the Savannah River. Apparently data do not exist from which radionuclide movement can be estimated. In the absence of such information with which impacts to human health can be estimated, cooling water from L-Reactor should not be discharged into Steel Creek.	Appendix D contains a thorough characterization of cesium-137 and cobalt-60 in the affected environment. The appendix also provides a rational approach for calculating the transport of cesium-137 and cobalt-60 from Steel Creek, in the Savannah River and to downstream water users. These transport estimates are independent of the inventories in Steel Creek. Remobilization and transport from Steel Creek are calculated from a data base developed from (1) cooling-water flow tests of the L-Area equipment at ambient water temperatures and discharges from L-Reactor outfall at rates up to 56 percent of the anticipated discharge when L-Reactor is operating; (2) laboratory desorption test; (3) transport during a hot-water diversion from P-Reactor at discharges up to 20 percent of the anticipated L-Reactor discharge; and (4) conservative estimates of Cs-137 transport in vegetation expected to be killed by the L-Reactor cooling-water flow. Transport calculations in the Savannah River and water-treatment plants are based on synchronous measurements at several river locations and of the finished water from the treatment plants. The approach used by the commentator to estimate a transport of 29 curies of cesium-137 during the first year has been shown to be invalid on the basis of suspended solid transport considerations.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

Revised Table 4-15. Alternative Model (Comments 32 and 33)
Estimates of cesium-137 remobilization from Steel Creek compared with current transport values^a

Location	River Mile	Inventory transported (Ci/yr)				Concentration in water (pCi/l)			
		Current values	After restart			Current values	After restart		
			1st year	2nd year	10th year		1st year	2nd year	10th year
Steel Creek mouth	141.6	0.22 ^c	29.0	14.5	0.1	5.3	73.6	36.8	0.03
Savannah River at 1.5 river miles below Steel Creek	140.1	0.41 ^b	29.0	14.5	0.1	0.04 ^b	3.10	1.55	<0.01
Hwy. 301 bridge	118.7	0.39 ^b	28.3	14.2	0.1	0.04 ^b	2.90	1.45	<0.01
Hwy. 17 bridge	21.4	0.20 ^b	14.8	7.4	0.1	0.02 ^b	1.52	0.76	<0.01
WATER-TREATMENT PLANTS									
Finished water									
Beaufort-Jasper	39.2	--	--	--	--	0.028	2.03	1.02	<0.01
Cherokee Hill	29.0	--	--	--	--	0.033	2.93	1.20	<0.01
EPA interim primary drinking-water standard	--	--	--	--	--	200	200	200	200

^aBased on mean transportation estimates made by Hayes (1983) and Hayes and Watts (1983) and data presented in Table D-14, and average flow rates in the Savannah River at locations indicated. Estimates of concentration and transport for the first, second, and tenth years represent only the contribution resulting from the remobilization of cesium-137 and cobalt-60 in Steel Creek by the resumed operation of L-Reactor. No alteration of existing water-treatment-plant systems were assumed.

^b1979-1982 average concentration measured at the Hwy. 301 bridge was 0.04 picocurie per liter; other values derived using appropriate flow rates and reduction factors.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF LEGAL ENVIRONMENTAL ASSISTANCE FOUNDATION (LEAF)		
1102 Healey Building, 57 Forsyth St., Atlanta, GA 30303 (404/688-3299)		
November 14, 1983		
The Legal Environmental Assistance Foundation (LEAF) appreciates this opportunity to comment on the Draft Environmental Impact Statement of the proposed restart of the L-Reactor at the Savannah River Plant.		
<u>NEED</u>		
EW-1	The most glaring error of the DEIS is its failure to convincingly state the need for a vast and immediate increase in nuclear weapons materials production, particularly in light of the U.S. public's overwhelming endorsement of the nuclear weapons freeze movement. DOE provides us with no evidence that the partial production option combining accelerated use of the Mark-15 at the SRP reactors and production of less-than-6-percent plutonium at the N-Reactor will not adequately meet U.S. nuclear weapons material needs. Nowhere do we find evidence that U.S. national security will be threatened by the delay of the L-Reactor operation until such crucial mitigations as cooling towers and reactor domes can be constructed.² Thus, DOE has failed to show the need for the resumption of L-Reactor in January 1984.	The approval of the Nuclear Weapons Stockpile Memoranda by the President and the subsequent authorization and appropriation of funds by the Congress constitute the DOE mandate to produce specific types and quantities of nuclear materials and weapons. The national policy on the deployment of nuclear weapons and the increased need for weapons is beyond the scope of this EIS. Section 2.1.2.4 of this Final EIS has been modified to state that none of these options or combinations of options can provide the needed defense nuclear materials required, nor can they fully compensate for the loss of the material that could be produced by L-Reactor. Also see the response to comment AB-2. National security concerns and the policy on nuclear weapons deployment is beyond the scope of this EIS.
<u>GROUNDWATER CONTAMINATION</u>		
EW-2	The DEIS inadequately addresses the nature and extent of groundwater contamination which would result from increased affluent and waste discharges.	The EIS provides extensive discussions on the ground-water regime at SRP (Section 3.4.2 and Appendix F) and of potential impacts to the ground waters beneath the SRP from operation of L-Reactor and its support facilities (Sections 4.1.1.3, 4.1.2.2, 4.4.3, 5.1.1.2, and 5.1.1.4). Also see the responses to comment AJ-1, DA-2, and DA-4 regarding ground water.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EW-3	The DEIS concedes that contamination of the superficial Barnwell aquifer has occurred from seepage basins at M-Area. This contamination would be exacerbated by the use of seepage basins for L-Reactor waste water. The DEIS then assumes that no contamination will occur in the lower aquifers because of the impermeable clay layers that separate the aquifers. An assumption is not adequate; the FEIS must consider data from monitoring wells in these aquifers. The State of South Carolina has already documented groundwater contamination of the Tuscaloosa which is the lowest lying aquifer. The DEIS must address these findings and provide its own data on this problem. The seepage basin method is no longer considered to offer adequate groundwater protection and such a method may violate RCRA requirements. Detritiation is being considered for implementation at the entire SRP and should therefore be implemented as part of the restart of the L-Reactor.	Information on ground-water contamination in M-Area is provided in Sections 5.1.1.2, 5.1.1.4, and F.5.4 of the EIS. Alternatives to the use of seepage basins are discussed in Section 4.4.3. Use of other seepage basins on SRP is being evaluated on a sitewide basis (Section F.6). Also see the responses to comments DA-2 and DA-4 regarding ground water. Documentation concerning groundwater contamination at SRP was compiled by DOE and Du Pont and promptly reported to the State and EPA. The detection of chlorinated hydrocarbons in two Tuscaloosa producing wells was publicly announced by DOE on April 8, 1983.
EW-4	The impact of additional groundwater withdrawals is also inadequately addressed. The DEIS data relies on current use; the impact of additional withdrawals on aquifer pressure must be considered. Any excessive withdrawal from an aquifer can result in head reversal allowing contamination of a lower lying aquifer from a more superficial one. The impact of withdrawals for increased population and anticipated increased irrigation use must be discussed. This is especially important because the area surrounding the SRP is not in a capacity use area, therefore not subject to state control of new or additional groundwater withdrawals. <u>AIR QUALITY</u>	The impacts associated with additional ground-water withdrawal from the operation L-Reactor and its support facilities are discussed in Sections 4.1.1.3, 5.1.1.2, and 5.1.1.4. Also see the responses to comments AW-1 and BT-7 regarding additional ground-water withdrawal.
EW-5	The DEIS inadequately discusses the impact on air quality of the use of a coal-fired generator for the L-Reactor. The DEIS notes a 15% increase in emissions and states that no violations will occur, but there is no information as to whether or not the SRP is in a non-attainment area or one subject to prevention of significant deterioration. Even assuming it is an attainment area, the DEIS must address the increment that these emissions will use.	The impact on air quality of the use of a coal-fired generator for the L-Reactor is discussed in Sections 4.1.1.6, and 5.1.1.3 of the EIS. The operation of the L-Reactor will not violate any ambient air quality standards. As noted in Chapter 7, the authority for the regulation of air emissions has been delegated by EPA to SCDHEC. SCDHEC issues operating permits and performs PSD reviews. As stated in Section 7.7 of the EIS, since all L-Reactor support facilities for steam supply and electric power generation will comply with existing permits, no new SCDHEC operating permits will be required. SRP is in an attainment area.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>ENDANGERED AND THREATENED SPECIES</u>		
	The startup of the L-Reactor would also have potentially adverse effects on the area's endangered and threatened species. Most of these adverse effects are traceable to 1) the thermal discharges released into the Steel Creek area, and 2) the increased water levels brought about by the release of cold water into the area, which is mentioned in the Environmental Assessment as being standard operating procedure for the reactor while it is on standby status. (The Environmental Assessment referred to here and in the draft EIS is the original assessment. A more current assessment is due around the first of December, and it is imperative that the questions presented herein be addressed in that assessment.) Of primary concern are the wood storks from the Birdsville Rookery in Millen, Georgia, which use the Steel Creek area as a feeding ground. Several questions regarding the effect of the reactor on this wood stork colony have been left unanswered in both the draft EIS and the Environmental Assessment. Among these questions which must be addressed are:	
M-478 EW-6	1) How important a feeding ground is this particular area? If it is vitally important (for instance, if the storks travel longer distances to the SRP site than they do to alternative feeding grounds), it may be a critical habitat for the birds which are currently on the federal list of threatened species and under consideration for endangered status under the Endangered Species Act of 1973.	See the responses to comments AD-1 and AD-4 regarding the wood stork.
EW-7	2) Are there other areas which could serve as reasonable alternative feeding sites? (These areas must be available on a long-term basis, as opposed to being small temporary wetlands which would dry up after a short time.)	Other foraging sites on the SRP include those of Beaver Dam Creek, Four Mile Creek, and portions of the Savannah River Swamp.
EW-8	3) What is the average number of wood storks seen feeding at the SRP site in comparison to the number seen at off-plant sites? A significant difference could be another indication of the value of the SRP site to the local wood stork population.	See the responses to comments AD-1 and AD-2 regarding use of SRP and off-plant sites.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EW-9	4) How would the startup of the L-Reactor affect the fish population in the area, and thus the stork's attraction to Steel Creek? It is pointed out in the Patterson Associates report (commissioned by the Beaufort/Jasper Water Authority) that fish eggs and fish larvae cannot survive temperatures higher than 80 degrees Centigrade. A diminution in the fish population in the area would make it less attractive not only for the storks, but for a number of other birds and mammals, as well as the endangered American alligator, that feed in the area.	The restart of the L-Reactor with direct discharge would eliminate foraging habitat of the wood stork because water temperatures would be too high to support fish, the major food. This impact, including those to other species such as the American alligator, reptiles, birds, and mammals, is discussed in Section 4.1.1.4 of the EIS.
EW-10	5) What is the number of wood storks using SRP wetlands on any single day, and how does that compare to the number using other off-plant sites? The draft EIS (page C-38) shows 147 individuals using SRP wetlands on July 14. This is over 60 percent of the entire population of breeding adults.	The number of wood storks that were observed on the SRP in 1982 and 1983 is presented in Table C-7, Appendix C of the EIS.
EW-11	6) Are there other areas which could serve as reasonable alternative feeding sites? (These areas must be available on a long-term basis, as opposed to being small temporary wetlands which would dry up in a short time.)	See the response to comment EW-7.
EW-12	7) What is the fledgling success rate of this colony in contrast to published fledgling rates for Florida populations? If the Birdsville colony is able to produce young at a higher than normal rate, then recognizing that this is an endangered - or nearly endangered species - it should not be disturbed nor should its food base be disrupted.	See the response to comment AD-9 regarding fledgling success rate.
EW-13	8) What are the predicted land use patterns and their effects on the non-SRP sites? Most of the non-SRP areas used by the Birdsville colony are probably on private lands. These sites may be in danger of conversion into agricultural lands over the next decade or so. The SRP wetlands, on the other hand, are part of the buffer area around the reactors and should be unaffected by changing land use patterns.	See the response to comment AD-10 regarding predicted land-use patterns and their effect.
EW-14	9) Why were there no wood storks recorded using the Steel Creek area after July 12? Had the colony dispersed or were the cold water releases (as mentioned in the Environmental Assessment as being standard) responsible for the storks' absence? If raised water levels were created artificially this suggests a strong bias in the data in terms of the actual amount of	See the response to comment AD-11 regarding observations of wood storks after July 12th.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	usage that Steel Creek might have received without the raised water levels. If this is so, why weren't the fluctuating water levels mentioned in the DEIS as a possible source of bias in the data? ⁴	
EW-15	10) On page 3-52 of the DEIS it says that the SRP wetlands appear to be important <u>post breeding</u> feeding habitat. Table C-7 shows heavy usage of SRP wetlands during June and July. Page C-37 states that birds were nesting in July 1980. On what data were the "post breeding" conclusions drawn?	See the response to comment AD-12 regarding "post breeding" habitat.
EW-16	11) Is it possible that the observed number of wood storks seen using the SRP wetlands in 1983 is a minimum number, due to variation in the timing of surveys? For instance, if a feeding site is surveyed early in the morning it may show fewer birds than a similar survey conducted in the early afternoon after thermals ⁵ have had a chance to develop.	Based on surveys from 23 June to 31 August 1983, a total of 238 breeding adults was counted at the Birdsville rookery. Surveys on the SRP, which were conducted from as early as 9:01 a.m. to as late as 9:00 p.m., showed a maximum single observation of 147 individuals and a cumulative total of 478 observations. Also, see the response to comment AD-15 regarding the timing and methodology of the surveys.
EW-17	It is necessary to bear in mind that this colony of wood storks is the northernmost in the world, and for purposes of genetic diversity, it is therefore vitally important. Any adverse effect on this colony may cause irreparable damage to the entire species.	See the responses to comments AD-16 and AD-17 concerning the Birdsville rookery. In addition, alternative cooling systems are addressed in Section 4.4.2 of the EIS.
	Congress has recognized the importance of preservation of the world's genetic diversity as an important goal. Preservation of the diversity within species is also recognized as necessary. This is shown by the extension of the Endangered Species Act to cover subspecies and local populations.	
	Besides mere genetic factors, protection of peripheral colonies of a rare species also helps to insure against the impact of a local catastrophe (such as hurricanes or prolonged drought).	
	The effect of the reactor on the wood stork population would be considerably reduced if some provision could be made to reduce the amount of thermal effluents released into the wetlands and the Steel Creek area. The problem here is that, since 1980 when President Carter decided to increase the production of	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	nuclear materials, there has been an apparent presumption that the L-Reactor could be restarted without any control of the thermal discharge. This presumption was apparently based on the prior operation of the plant and did not account for pollution laws enacted subsequent to the reactor being placed on standby status in 1968. Since then, the area has recovered to a great extent. The proposed startup, with no provisions for treatment of the thermal discharges, would reverse the recovery. <u>OFF-SITE TRANSPORTATION</u>	
EW-18	The DEIS notes that the startup of the L-Reactor will increase both on-site and off-site transportation of radioactive materials. Although these shipments are subject to DOT shipping regulations, they are not subject to the NRC pre-notification requirements. The fact that increased amounts of radioactive materials will move through numerous states with no notification to the respective state governments should be addressed in the FEIS.	See the response to comment AY-10 regarding transportation of radioactive materials.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
<u>FOOTNOTES</u>		
	1. In May 1983, 278 members of the U.S. House of Representatives and 40 members of the U.S. Senate voted in support of HJRes 13 and SJRes 2, respectively, the Nuclear Freeze Resolutions, calling for a bilateral nuclear freeze between the Soviet Union and the U.S. In September 1983, 77% of the U.S. public polled by Louis Harris and Associates said they would "favor Congress passing a resolution that would call upon the U.S. to negotiate a nuclear freeze agreement with the Soviet Union that would encourage both sides to ban the future production, storage and use of nuclear weapons."	
M-482 EW-19	2. While DOE maintains that a closed loop cooling system at the L-Reactor would cost \$39 million and take more than three years to install, the Chicago consulting firm of Patterson Associates, Inc. estimates that such a system would cost 8 to 9 million dollars with an installation time of 10 to 16 months. 3. The DEIS inadequately addresses the impact of the startup of the L-Reactor on the biologic systems in the affected area. The DEIS asserts that 1,000 acres of wetlands will be affected by thermal discharges. This information is based on an early biological assessment which was based on insufficient data. An independent study by Patterson Associates, Inc., for the Beaufort/Jasper Water Authority found that in fact 28,000 acres of wetland would be affected. This divergence should be addressed in the FEIS. 4. Wood storks require areas with lowered water levels, where their prey (fish) have been concentrated. By adding water to Steel Creek, the water levels may be raised too high for the storks to forage successfully. 5. Wood storks, like other soaring birds, use thermals (columns of heated rising air) in order to easily travel long distances. Thermals do not normally develop until mid- to late-morning.	Responses to the Patterson Associates, Inc., report were submitted at the February 9, 1983, Senate Armed Services Committee hearing. With respect to the costs estimates of cooling towers, the Patterson Associates, Inc., report did not account for several significant cost elements and is thus in error. With respect to wetlands, the Patterson report erroneously included upland areas in the estimate of wetlands.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF BASIL G. SAVITSKY		
Basil George Savitsky Post Office Box 50228 Columbia, SC 29250		
November 12, 1983		
Mr. M. J. Sires Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, SC 29801		
Dear Mr. Sires:		
I am a graduate student in the Department of Geography at the University of South Carolina. My area of interest is agricultural remote sensing, but I am concerned about all forms of resource management.		
EX-1	As a student of the earth sciences, I've been following with interest reports about the Savannah River Plant, particularly the draft EIS concerning the status of the L-Reactor. It appears to me that the EIS should take into account all possible consequences of an operational L-Reactor. One such consequence is the actual use of nuclear weapons, and the potential purpose of the L-Reactor in such an environmental catastrophe cannot be overlooked. Although it would be easy to pass the responsibility for such an action from the realm of science to the political and military decision-making process, I recommend that scientific knowledge available on the environmental effects of nuclear war not be excluded from the EIS.	The national policy on nuclear weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS.
	I have enclosed a summary of findings from the recent Conference on the Long-Term Worldwide Biological Consequences of Nuclear War. The large number of participants in the conference and the eminence of the scientists representing the	

M-483

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	physical and biological disciplines gives an extremely high level of validity to the findings of the conference.	Research was done on biological damage from various scales of nuclear war, so findings on the effects of a limited nuclear conflict could prove especially significant. Results of research on atmospheric dust content, lethal temperature changes, and the impact on the food supply represent new environmental hazards to those previously recognized such as radioactive fallout and fire. I strongly urge that the Proceedings from the conference be obtained, since they represent years of research on the environmental impact of the catastrophic use of what the L-Reactor would produce. And I would submit these summarized findings as enclosed for the record. Sincerely, Basil G. Savitsky
	Enclosure	

M-484

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
THE WORLD AFTER NUCLEAR WAR CONFERENCE ON THE LONG-TERM WORLDWIDE BIOLOGICAL CONSEQUENCES OF NUCLEAR WAR OCTOBER 31-NOVEMBER 1, 1983	Summary of Conference Findings CONFERENCE FINDINGS INDICATE STARTLING CHANGES IN EARTH'S CLIMATE AFTER NUCLEAR WAR COULD HAVE DEVASTATING IMPACT ON SURVIVORS	<u>Embargoed until Midnight October 30, 1983.</u> INTRODUCTION The world's nuclear arsenal today stands at over 12,000 megatons (MT), enough to destroy one million Hiroshimas. Recent studies estimate that anywhere from 300 million to 1 billion people would be killed outright in a large-scale nuclear war (5,000-10,000 MT yield) and an equal number would suffer serious injuries requiring immediate medical attention--which would be largely unavailable. But what of the longer-term effects of nuclear war? What kind of world would survivors face? New evidence suggests that the lingering atmospheric and biological consequences may be even more serious than the immediate ones. These findings will be presented at the Conference on the Long-Term Worldwide Biological Consequences of Nuclear War being held in Washington, D.C. October 31 - November 1, 1983. The findings are largely the result of studies done over the last two years by Richard P. Turco; Owen B. Toon, Thomas P. Ackerman and James B. Pollack, of NASA Ames Research Center; and Carl Sagan, of Cornell University, on the optical and climatic impacts of the dust and smoke particles which would be generated in nuclear war. Their work has been critically reviewed by some 100 eminent physicists, atmospheric scientists and biologists from the U.S. and other countries who participated in a series of meetings held earlier this year in Cambridge, Massachusetts.

M-485

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	The atmospheric findings, which augment earlier studies and introduce previously unforeseen consequences of nuclear war, have been reported in a paper entitled "Global Atmospheric Consequences of Nuclear War" (referred to as the "TTAPS" paper, after the names of its authors). The authors conclude that a nuclear war, even at the level of 100-1,000 MT could cause profound climatic and meteorological disturbances, including darkness and extreme cold, and that exposure to radioactivity would be much greater than previously projected.	
	Some 40 biologists reviewed the atmospheric findings, determined the biological consequences and also considered other potential ecological effects not caused by atmospheric changes. Their conclusions are outlined in a separate paper entitled "The Long-Term Biological Consequences of Nuclear War."* Their unanimous view is that the atmospheric stresses resulting from nuclear war could so disrupt the earth's biological support systems that the extinction of a significant proportion of the earth's animals and plants would occur. They conclude that the possibility of human extinction cannot be excluded.	
	At the Conference, Dr. Sagan will present the atmospheric and climatic consequences and Dr. Paul R. Ehrlich of Stanford University will present the biological consequences. <u>The Conference begins at 2 P.M., Monday, October 31, in the Confitlion Ballroom of the Sheraton Washington Hotel.</u>	
	METHODOLOGY	
	To study the optical and climatic effects of dust and smoke clouds generated in a nuclear war, the physicists ran computer models of dozens of different nuclear war scenarios. They adopted as a baseline case a 5,000 MT exchange with 20% of the explosive power (yield) expended on urban or industrial targets in the Northern Hemisphere. Given current arsenals, this is a realistic possibility for a full-scale war. Other cases studied ranged in total yield from 100 to over 10,000 MT.	

*See Appendix 1 for names of the principal authors.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	In each case, the scientists calculated:	
	1. How much dust and smoke was generated; 2. How much sunlight was absorbed by the dust and smoke; 3. How much the temperature changed; 4. How the dust and smoke spread, and how long before it all fell back to the surface; 5. The extent of radioactive fallout over time; 6. How much ultraviolet light reached the surface after the soot and dust fell out.	
	The following conclusions reflect aggregate data from the baseline scenario in the original TTAPS paper and from the paper on "The Long-Term Biological Consequences of Nuclear War." They have been substantially edited. Complete scientific and technical support data will be provided at the Conference.	
	CONCLUSIONS	
	1. Unbroken Pall of Darkness Would Cover Northern Hemisphere	
	Within a week after the war, the amount of sunlight at ground level could be reduced to just a few percent of normal; an unbroken gloom could persist for weeks over the Northern Hemisphere. The light would be absorbed primarily by sooty smoke from nuclear fires ignited by surface bursts and airbursts. The total amount of smoke released in the baseline model is 225 million tons (released over several days). Smoke particles are extremely small, which lengthens the time they remain in the atmosphere. The soil dust raised by surface bursts, while important, would have less climatic impact since it is typically poorly absorbing.	
	o <u>Low light level would disrupt photosynthesis, food chain.</u>	
	In the early months following a substantial nuclear exchange, the amount of light filtering through the cloud cover might not be adequate to sustain photosynthesis. Even assuming that plants would be otherwise undamaged, which is unrealistic, the lack of light would severely limit growth, and the consequences would cascade through all food chains.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	2. Effects on Southern Hemisphere Greater Than Previously Assumed	
	Large disturbances in global circulation patterns could greatly accelerate the interhemispheric transport of smoke, dust and radioactivity. Rapid interhemispheric mixing means that the Southern Hemisphere could be subjected to massive injections of nuclear debris soon after an exchange in the Northern Hemisphere. Possible rapid transport of dust and smoke from the Northern to the Southern Hemisphere may involve the entire planet in after-effects. Previous studies have assumed that Southern Hemisphere effects would be minor.	
	3. Harsh "Nuclear Winter" Would Prevail	
	Contrary to the conclusions reached in most earlier studies, nuclear war probably would have a major impact on climate lasting for several years. It would be manifested by a dramatic drop in land temperatures to subfreezing levels for several months, large disturbances in global circulation patterns, and dramatic changes in local weather and precipitation. Even if the war were to occur in the summer, many areas might be subject to continuous snowfall for months.	
	o <u>Subfreezing temperatures would substantially reduce chances for human survival.</u>	
	Except for areas near coastlines, land temperatures would plunge from -15°C(+5°F) to -25°C(-13°F), with dire consequences for survivors. The impact of dramatically reduced temperatures on plants would depend on the time of year at which they occurred, their duration, and the tolerance limits of the plants. The abrupt onset of cold is of particular importance, though, since plants that normally can withstand subfreezing temperatures would have no time to develop tolerance. A spring or summer war could kill or damage virtually all crops in the Northern Hemisphere.	
	Most uncultivated food sources also would be destroyed, as would most farm animals. Many animals that survived would die of thirst, as surface fresh water would be frozen over the interior of continents. Available food supplies would	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	be rapidly depleted. Most of the human survivors would starve. o <u>Non-target areas that import food directly affected.</u> Nations that now require large imports of foods, including those untouched by nuclear detonations, would suffer the immediate cessation of incoming food supplies. These countries would be forced to rely on their local agricultural and natural ecosystems. This would be especially serious for many less-developed countries, particularly those in the tropics.	
	4. Exposure to Radioactive Fallout Worse than Expected Exposure to radioactive fallout would be more widespread than is predicted by standard empirical exposure models because of the intermediate fallout which would extend over many days and weeks. With unprecedented quantities of fission debris released into the atmosphere, even areas remote from the explosion sites would be subject to large doses of fallout radiation. o <u>Radiation doses approach lethal dose for humans.</u> In the baseline case, roughly 30 percent of the land at Northern mid-latitudes (30°N to 60°N) would receive a radioactive dose greater than 250 rads over several months. About 50 percent of the Northern mid-latitudes would receive a long-term dose greater than 100 rads. (This dose includes radionuclides ingested from contaminated food.) These doses are roughly ten times larger than previous estimates. A 100 rad dose is the equivalent of approximately 1,000 medical x-rays. A 400 rad whole-body acute dose is usually considered lethal. Doses this large can affect the immune system and increase the probability of infectious disease, cancer and genetic and embryonic defects.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
5.	No Ice Age, but the Ocean Would Not Provide Relief	
	Because the climatic effects would not last longer than a few years, an Ice Age would probably not be generated. Subfreezing temperatures will freeze most freshwater systems to considerable depth, leaving survivors without surface water. The oceans will not freeze due to their enormous reservoir of heat. It has often been thought that the coastal areas would be a major source of food for survivors of a nuclear war. However, the combined effects of darkness, ultraviolet light, severe coastal storms due to enormous land-sea temperature differentials, run-off of slit and toxic chemicals from the land, destruction of ships and concentrations of radionuclides in fish and other marine life cast strong doubt on this contention.	
6.	Fire Would be a Major Problem With Serious and Unanticipated Consequences	
	About one-sixth of the world's urbanized land area, or about 240,000 km² would be partially burned by about 1,000 MT of explosions in the baseline scenario. The remaining 4,000 MT of yield could ignite wildfires and firestorms. Uncontrolled fires could sweep over large areas. For example, multiple airbursts over California in the late summer or early fall could burn off much of the state, leading to catastrophic flooding and erosion during the next rainy season.	
	o <u>Urban fires would generate large amounts of deadly toxins.</u>	
	Cities hold large stores of combustible, synthetic materials that would release large quantities of toxic gases (pyrotoxins) as they burn, including carbon monoxide, cyanides, dioxins and furans. These pollutants might have only limited immediate effect on vegetation, but they would certainly hinder the recovery of vegetation devastated by nuclear blast and fire. Transport by winds to distant, initially unaffected ecosystems could be an important additional adverse side effect. This problem had not been addressed in previous studies.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
7.	Ozone Depletion Would Increase Exposure to Ultraviolet Light (UV-B)	High-yield explosions would inject nitrogen oxides (NO_x) into the stratosphere, which would result in large reductions in the ozone layer. The ozone layer, only 3 millimeters thick if it were brought down to sea level, shields the earth from UV-B, a damaging type of radiation. In the baseline case, dust and soot would absorb the increased UV-B at first. But when the dust and soot cleared a few months later, UV-B doses roughly 1.6 times normal would be transmitted to the surface. Increased levels of UV-B can harm biological systems in several ways. The immune systems of humans and other mammals are known to be suppressed by relatively low doses of UV-B. Given the conditions of increased radioactive fallout and other stresses, such suppression of the immune systems leads to an increase in the incidence of disease. Protracted exposure to increased UV-B also may lead to widespread blindness among humans and other mammals.
8.	Tropical Forests Could Disappear	Tropical plants are less able to cope with even short periods of cold and dark than those in temperate zones. If darkness or cold, or both, were to become widespread in the tropics, the tropical forests, which are the major reservoir of organic diversity, could largely disappear. This would, in turn, lead to the extinction of a majority of the species of plants and animals on earth. o <u>Dependence on imports threatens survivability in tropical and developing countries</u> The dependence of urban populations in many tropical and developing countries on imported food would lead to severe effects, even if those areas were not affected directly by the war. Large numbers of people would be forced to leave the cities and attempt to cultivate the remaining areas of forest, accelerating their destruction and the consequent rate of extinction. Regardless of the exact distribution

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	of the immediate effects of the war, everyone on Earth would ultimately be profoundly affected. 9. Even Small Nuclear Exchanges Could Trigger Severe After-effects Relatively large climatic effects can result from small nuclear exchanges (100 to 1,000 MT). A scenario involving 100 MT exploded in the air over cities could produce a two-month interval of subfreezing land temperatures, with a minimum near -23°C. In this scenario thousands of fires would be ignited and the smoke from these fires alone would generate a period of cold and dark almost as severe as in the baseline (5,000 MT) case. IN SHORT: In the aftermath of a 5,000 MT nuclear exchange, survivors would face extreme cold, water shortages, lack of food and fuel, heavy burdens of radiation and pollutants, diseases and severe psychological stress -- all in twilight or darkness. It is clear that the ecosystems effects <u>alone</u> resulting from a large-scale thermonuclear war would be enough to destroy civilization as we know it at least in the Northern Hemisphere. These long-term effects, when combined with the direct casualties from the blast, suggest that eventually there might be no human survivors in the Northern Hemisphere. Human beings, other animals and plants in the Southern Hemisphere would also suffer profound consequences. <u>The scenario described here is by no means the most severe that could be imagined with present world nuclear arsenals and those contemplated for the near future.</u>	

###

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	The World After Nuclear War Conference on the Long-Term Worldwide Biological Consequences of Nuclear War October 31-November 1, 1983 George M. Woodwell Chairman Carl Sagan Physical Sciences Peter H. Raven Biological Sciences Chaplin B. Barnes Executive Director	

Appendix 1

THE LONG-TERM BIOLOGICAL
CONSEQUENCES OF NUCLEAR WAR

This paper was prepared following a meeting of biologists on the Long-Term Worldwide Biological Consequences of Nuclear War (Cambridge, Massachusetts, 25-26 April 1983). The consensus of the 40 scientists at the meeting is presented here, assembled by the following committee.

Principal authors: Paul R. Ehrlich, Stanford University; Mark A. Harwell, Cornell University; Peter H. Raven, Missouri Botanical Garden; Carl Sagan, Cornell University.

Committee: Edward S. Ayensu, Smithsonian Institution; Joseph Berry, Carnegie Institute of Washington; Anne H. Ehrlich, Stanford University; Thomas Eisner, Cornell University; Stephen J. Gould, Harvard University; Herbert D. Grover, University of New Mexico; John Harte, University of California, Berkeley; Rafael Herrera, IVIC, Venezuela; Robert M. May, Princeton University; Ernst Mayr, Harvard University; Christopher P. McKay, NASA Ames Research Center; Harold A. Mooney, Stanford University; David

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Pimentel, Cornell University; John M. Teal, Woods Hole Oceanographic Institution; and George M. Woodwell, Marine Biological Laboratory, Woods Hole.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

TABLE 1

TEMPERATURES AND LIGHT LEVELS FOLLOWING A 10,000 MEGATON NUCLEAR
WAR IN THE NORTHERN HEMISPHERE
(Severe But Not Implausible Scenario)

NORTHERN HEMISPHERE CONTINENTAL SURFACE TEMPERATURES*

Predicted Value	Duration	Area Affected	Possible Range
-45°F (-43°C)	4 mo	Midlatitudes	-63 to -9°F
-9°F (-23°C)	9 mo	Hemisphere	-27 to +27°F
27°F (-3°C)	1 yr	Hemisphere	+9 to +45°F

SOUTHERN HEMISPHERE CONTINENTAL SURFACE TEMPERATURES*

Predicted Value	Duration	Area Affected	Possible Range
0°F (-18°C)	1 mo	Midlatitudes	-27 to +27°F
27°F (-3°C)	2 mo	Midlatitudes	-9 to +45°F
45°F (+7°C)	10 mo	Midlatitudes	+9 to +55°F

NORTHERN HEMISPHERE SUNLIGHT INTENSITY AS PROPORTION OF NORMAL

Predicted Value	Duration	Area Affected	Possible Range
.01	1.5 mo	Midlatitudes	.003 to .03
.05	3 mo	Midlatitudes	.01 to .15
.25	5 mo	Hemisphere	.1 to .7
.50	8 mo	Hemisphere	.3 to 1.0

SOUTHERN HEMISPHERE SUNLIGHT INTENSITY AS PROPORTION OF NORMAL

Predicted Value	Duration	Area Affected	Possible Range
.1	1 mo	Midlatitudes	.03 to .3
.5	2 mo	Tropics & Midlatitudes	.1 to .9
.8	4 mo	Hemisphere	.3 to 1.0

*Coastal areas warmer but very stormy

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	The World After Nuclear War Conference on the Long-Term Worldwide Biological Consequences of Nuclear War October 31-November 1, 1983 George M. Woodwell Chairman Carl Sagan Physical Sciences Peter H. Raven Biological Sciences Chaplin B. Barnes Executive Director	
	PANEL PARTICIPANTS November 1, 1983 <u>Atmospheric and Climatic Effects Panel</u> Thomas F. Malone, Moderator (See Program) Paul J. Crutzen Dr. Crutzen is currently Director of the Max-Planck-Institute for Chemistry in Mainz, Federal Republic of Germany; he previously headed up the Institute's Atmospheric Chemistry Division. He also serves as Affiliate Professor at the Atmospheric Science Department, Colorado State University, Fort Collins. He was previously Senior Scientist and Director of the Air Quality Division of the National Center for Atmospheric Research, Boulder, Colorado. In 1977, while serving at the Environmental Research Laboratories of the National Oceanic and Atmospheric Administration in Boulder, he received the NOAA Special Achievement Award.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
M-497	Georgiy S. Golitsyn	
	Dr. Golitsyn is Senior Scientist at the Institute of Atmospheric Physics of the Academy of Sciences of the USSR in Moscow. He is an expert in large-scale climatic dynamics, in planetary atmospheres and in turbulence theory. Dr. Golitsyn is a Corresponding Member of the Academy of Sciences of the USSR and is a member of the Joint Scientific Committee for World Climate Research Programs of the International Council of Scientific Unions and the World Meteorological Organization.	
	John P. Holdren	
	Dr. Holdren is Professor of Energy and Resources and Acting Chairman of the Energy and Resources Group, University of California, Berkeley. He holds concurrent positions as Participating Guest in the Energy and Environment Division of the University's Lawrence Berkeley Laboratory, Faculty Consultant in the Magnetic Fusion Energy Division of the Lawrence Livermore National Laboratory, and Senior Investigator at the Rocky Mountain Biological Laboratory.	
He is Vice Chairman of the Federation of American Scientists and is currently Chairman of the U.S. Pugwash Group and a member of the Executive Committee of the International Pugwash Council. He is a Fellow of the American Academy of Arts and Sciences and serves as Vice Chairman of its Committee on International Security Studies.		
In 1981 he was awarded a five-year MacArthur Foundation Prize Fellowship for distinction in the fields of physics, energy and environment.		
Stephen H. Schneider		
	Dr. Schneider is Deputy Director, Advanced Study Program, National Center for Atmospheric Research. At NCAR he also serves as Senior Scientist and Head of the Visitors Program. He has written and consulted extensively and has participated in numerous forums on issues of climatic change, food and energy.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	He is a Founding Member of the Council on Science and Technology for Development and is Editor of the Journal <u>Climatic Change</u>.	
	Richard P. Turco	
	Dr. Turco has been a Research Scientist in atmospheric chemistry and physics at R&D Associates, Marina del Rey, California since 1971. Dr. Turco has made research contributions in areas of atmospheric science related to: stratospheric ozone photochemistry, aerosol physics and chemistry, and the chemistry of planetary atmospheres. He has served as a member of several national workshops and has written extensively on topics concerned with air pollution of the upper atmosphere. He is currently a member of the National Research Council's Committee on the Atmospheric Effects of Nuclear Explosions.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	PANEL PARTICIPANTS November 1, 1983	
	<u>Biological Effects Panel</u>	
	George M. Woodwell, Moderator (See Program)	
	Joseph A. Berry	
	Dr. Berry is a Staff Member, Department of Plant Biology, Carnegie Institution of Washington, Stanford, California, with which he has been affiliated since 1972. He also serves as Assistant Professor, Department of Biological Sciences, Stanford University. He holds degrees in Chemistry, Soil Science and Botany. His research interest is the physiological basis for plant-environment interaction.	
	Thomas Elsner	
	Dr. Elsner is Jacob Gould Shurman Professor of Biology at Cornell University, at which he has taught since 1957. He is an ardent naturalist, whose research deals with the behavior and ecology of insects, and with photographic and cinematographic documentation of little-known aspects of these animals. He has served as a director of Zero Population Growth, The Nature Conservancy, the National Audubon Society and The Federation of American Scientists and is currently a member of several committees of the American Association for the Advancement of Science. He is a Member of the National Academy of Sciences and a Fellow of the American Academy of Arts and Sciences.	
	John Harte	
	Dr. Harte is currently Professor of Energy and Resources, University of California, Berkeley, where he has taught since 1973. He also holds the position of Faculty Senior Scientist at the Lawrence Berkeley Laboratory. His research has ranged from theoretical elementary particle physics to environmental issues such as acid precipitation, water resource scarcity and toxic substance testing. He is the author of numerous papers	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	and is a member of and Principal Investigator at the Rocky Mountain Biological Laboratory. He has been a member of three National Academy panels concerned with problems of energy and environment. Mark A. Harwell Dr. Harwell is Research Associate, Ecosystems Research Center, and Assistant Professor, Natural Resources Department, Cornell University. He has initiated a number of activities related to the evaluation of the human and natural systems consequences of nuclear war, among them serving as a member of the Ecological Society of America's <u>ad hoc</u> committee on this topic.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF MAUREEN K. MURRAY Grade 8 Student of H.E. McCracken Middle School 13 Warbler Lane Hilton Head, SC 29928 Dear Mr. Sires: EY-1 I do not think that you should restart the L-Reactor because you and the DOE don't really know the risks and we, the people of the surrounding areas, do not want to be part of the death toll that makes up those statistics on risks. Most of us would like it very much if we could live our whole lives and go on living without the fear of a spill or explosion. I speak for everyone I know and for H.E. McCracken Middle School in South Carolina (about 74 miles away from the Savannah River Plant). The school did not make me write this. I went to one of your hearings and listened to both sides. In the beginning I was neutral, but later on as I heard more public speakers, I realized that the public was correct: The L-Reactor plant should stay closed. Sincerely, Maureen K. Murray Grade 8, Student of H.E. McCracken Middle School		
		The EIS contains thorough discussions of risks to the public health and safety and to the environment as a result of the restart of L-Reactor. Any exposure of the public to radiation resulting from L-Reactor operation would be minimal compared to exposure from natural or other manmade radiation sources. The risks due to possible reactor accidents are also small.

M-501

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF DR. JUDITH E. GORDON November 14, 1983 SIERRA CLUB South Carolina Chapter To: Dept. of Energy, Savannah River Plant Operations From: Dr. Judith E. Gordon Re: Draft EIS, L-Reactor Operation, SRP. In my oral presentation at the Augusta hearings, October 31, 1983, I indicated that I would be submitting additional written comments. These are as follows:		
EZ-1	1. Impingement, p. 4-3, and 5-31. The EIS indicates a cumulative total of about 19 fish/day. However, more recent data suggest this figure is more likely to be 41.3 fish/day (ECS-SR-5, Sav. Riv. Aquatic Ecology Rept, Prelim 83).	Estimates of impingement, as calculated from the most recent available data, are presented in Section 4.1.1.2 and Appendix C of this EIS.
EZ-2	2. Thermal discharge, 4.1.1.4. This entire section is extremely confusing because of the different delta T's used in the charts and tables, along with varying river flows. How do Tables 4-4 and 4-5 relate to the suggested maximum delta T of 9° C? On p. 4-8 why were the most severe 5-day meteorological conditions only based on the short time span, 1976-1980?	See the response to comment AA-1 regarding cooling-water mitigation alternatives. Also note that due to other comments received the analysis of the reference case thermal discharge in relation to the August 1982 draft NPDES permit has been deleted in Section 4.1.1.4. An analytical procedure similar to that required by the NRC for establishing adverse heat dissipation criteria for the design of ultimate heat sinks was used to select the most severe 5-day meteorological conditions for evaluating the biological effects of alternative cooling water systems.
EZ-3	3. Fish management programs, p. 4-116. This approach is of questionable value to anadromous species, especially when they appear to show preferences for particular streams in the river drainage as reported in ECS-SR-5, see above. Further, this approach offers nothing for endangered fish species nor does it address other problems associated with loss of wetlands.	Section 4.4.2 of the Draft EIS described both the feasibility and limitations of fishery management alternatives for anadromous and endangered species, i.e., shortnose sturgeon. Both the American shad and striped bass spawn primarily in the river. The blueback herring uses several creeks and adjoining floodplains for spawning throughout much of the Savannah River basin. The shortnose sturgeon is a bottom river spawner and is not adversely affected by the restart of L-Reactor based on the biological opinion from the NMFS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
EZ-4	4. Wetlands, p. 5-24. The 1982 EA and this draft EIS show a discrepancy in wetlands acreage figures. For example, the EA says that SRP contains 39,000 acres, the draft EIS says 37,000. The wetlands acreage impacted in the EA is 2000, but it is 1600 in this EIS. Which figures are correct?	The land area of the SRP is 192,323 acres; standing water or seasonally moist areas total 39,870 acres (Du Pont 1983). Wetlands are addressed in Sections 4.1.1.4, 5.2.4, and Appendix I of the EIS.
EZ-5	5. As indicated in 3 above, it is not necessarily true that other suitable spawning habitat exists in other streams along the Savannah River (p. 5-30). Also, since many areas are privately owned, their protection is less likely than that for properly managed government holdings.	Recent fisheries surveys indicate that Steel Creek is one of several streams used along the Savannah River by resident river species such as yellow perch and crappie as well as the anadromous blueback herring. The floodplains below Augusta have been modified more by government activities such as flood control, channelization, and dredging than from SRP thermal effluents and from modification by private ownership. The wetlands (originally floodplains) above Augusta have been modified extensively by several government-operated reservoirs. Appendix C of this Final EIS contains additional data from recent fisheries studies.
EZ-6	6. ANSP studies, p. 4-18. Given the infrequency of these studies, it is unlikely that they have much relevancy to the health or status of the Savannah River.	In addition to the ANSP studies that were performed for 6 years, more extensive quantitative ecological studies are currently being performed. Monitoring programs are discussed in Chapter 6 of the EIS.
EZ-7	7. River temperatures, p. 3-20. In comparing River mile 156.8 and 118.7, the number of times the temperature exceeded 28° C was given for River mile 156.8. What are these figures for River mile 118.7?	Records are not kept on the number of exceedances of various temperatures such as 28°C at the Highway 301 bridge monitoring station (River Mile 118.7).
EZ-8	8. Radiation levels, p. 3-60. Are the 66 mrem/year cited in addition to background radiation or is this included?	The 66 millirem per year includes background gamma radiation due to cosmic and terrestrial sources, which account for virtually all of it.
EZ-9	9. Dose to average individual, p. 3-59. A value of 195.3 mrem may be average, but it hardly represents the dose to an average individual. Most "average" persons do not receive 92.5 mrem of medical radiation each year, and these figures are thus misleading.	The "average" individual referenced is meant to provide a representative case for comparing levels of radiation exposure with those associated with L-Reactor restart and operation. By definition, the 92.5-millirem value is the average medical radiation exposure per person in the United States, not the medical exposure to an average person. It is recognized that the radiation dose to any specific individual will vary from the average depending on that person's exposure to controllable sources of radiation such as medical X-rays. In any case, even

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		if medical radiation was completely deleted as a consideration, the doses due to L-Reactor restart and operation still represent a small percentage of background radiation levels.
EZ-10	10. Probabilities, p. 4-54. What is the source of the probability figures used in this section?	See the responses to comments AY-9 and BL-12 regarding probabilities.
EZ-11	11. N-Reactor, p. 2-5. There is no discussion in this draft EIS as to why less-than-6-percent plutonium production at N-Reactor at Hanford was not a viable option to restart of the L-Reactor. Is this also classified information?	See the response to comment EW-1 regarding partial production options.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF L.L. GADDY L.L. Gaddy, Consulting Biologist Rte. 1, Box 223 Walthalla, South Carolina 29691 (803) 638-2863 November 12, 1983 Mr. M.J. Sires, III Assistant Manager, Health, Safety, & Environment Dept. of Energy Savannah River Operations Office Aiken Mr. Sires: This letter is to register my opposition to several of the cooling water alternatives proposed in Section 4.4.2 (Volume 1) of the Draft Environmental Impact Statement for the L-Reactor Operation: Savannah River Plant, Aiken, S.C. I. Direct Discharge of Thermal Effluents into Steel Creek.		
FA-1	I am opposed to this alternative because of the known consequences. High water temperatures would make most of Steel Creek and some of the Savannah River floodplain uninhabitable by most life forms. The endangered American alligator and the Wood Stork (proposed endangered), both of which are now present here, could not survive in such a thermally-stressed environment.	See the responses to comments AA-1 and AB-13 regarding cooling-water mitigation alternatives.
FA-2	Secondly, direct discharge of thermal effluent would possibly transport contaminated alluvium--radiocesium accidentally released from the L-Reactor in 1954-1968--downstream in suspended solution, reintroducing this now-buried radiocesium into the food chain.	Section 4.4.2 describes each alternative cooling-water system considered. The remobilization and transport of radiocesium has been considered for each alternative. Consideration is given to radiocesium transport in relation to the timing of mitigative action implementation, before or after restart of L-Reactor.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
II. All "Once Through" Systems Proposed.		
FA-3	I am especially opposed to the diversion of thermal effluent into Pen Branch, parts of which are relatively pristine. In 1981, I surveyed Pen Branch for endangered and threatened plants for the Savannah River Ecology Laboratory. I found no such plants; however, I did observe several interesting bogs and floodplain communities along the branch. These communities--some of which were dominated by relatively mature trees--would be destroyed under the "Once Through Cooling by Diversion to Pen Branch" plant.	Alternatives to direct discharge, other than diversions to Pen Branch are considered; they are compared in Section 4.4.2.5. Also see the response to comment AA-1 regarding cooling-water mitigation alternatives.
FA-4	I found much of the DEIS too general, with little or no hard data cited in some cases. In light of the statement in the press that the entire EIS process will cost around 1.5 million dollars, I was surprised to find that most of the studies cited were done prior to 1982. It seems that none of this money went for the collection of additional environmental data. In the final EIS, I think it would be interesting to see an itemized account of the costs of the EIS.	As described in the EIS, DOE has expended about \$204 million in modernizing and renovating L-Reactor. The Department has also spent over \$5 million in environmental studies and reports. Twelve public hearings have been held in South Carolina and Georgia, and an extensive support document library has been assembled. DOE will continue to conduct extensive environmental studies, including assessment of ground-water impacts and thermal mitigation. Also see the response to comment CD-2 regarding additional data that have been included since the Environmental Assessment.
Respectfully submitted,		
L.L. Gaddy		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF KERRY COOKE The Snake River Alliance Box 1731 Boise, ID 83701 208/344-9161 November 14, 1983 Mr. Melvin Sires U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801 SUBJECT: COMMENTS ON DEIS FOR L-REACTOR Mr. Sires:		
M-507 FB-1	The Department of Energy and the management of the Savannah River Plant have consistently downplayed the effects of the start-up of the L-Reactor on the Savannah River area. The environmental impact the Savannah River Plant will have on the future of the Savannah River area should dictate a high level of honesty and a willingness to do whatever can be done to protect the total environment from pollution and eventual damage.	Specific, quantitative evaluations of the impacts of the L-Reactor restart were developed and published in the Environmental Assessment. These impacts are further detailed in the EIS.
FB-2	However, it seems clear that the DOE does not share in this thinking. The DOE avoided doing a complete EIS until legally hardpressed to let the public comment on this project. Further, the DOE's attitude throughout this process has been one of eliminating hurdles to start up the L-Reactor. Never at any time in the months surrounding this controversy has the DOE given any sign that there was any significance placed on the concerns expressed by the public and state and local entities. Cost and time factors have consistently outweighed concern for the future.	DOE was charged by the President with restarting L-Reactor. DOE has consistently expressed its intention that the restart will be in accordance with all applicable Federal and state environmental protection regulations.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FB-3	The Snake River Alliance, an Idaho citizens' group, requested a copy of the L-Reactor draft EIS in a letter to you dated October 7. You chose to respond to our letter on October 25, stating that a copy of the Draft EIS was enclosed. No EIS was enclosed, and we mistakenly assumed it would be coming under separate cover. As of November 14, the last day for comments, the EIS has not arrived. This sort of disregard for public involvement is indicative of the Department of Energy's attitude about the L-Reactor start up in general. The NEPA process was formulated to "encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation..." The DOE has chosen to disregard the intent of this policy and has violated the public trust in their handling of the L-Reactor start-up. The people of the Savannah River area live under the double threat of death by nuclear war, and death by nuclear material contamination. The abuses of shortsighted management must stop if we are to survive. The L-Reactor should not be restarted. Kerry Cooke for the Snake River Alliance	DOE distributed copies of the EIS to more than 750 individuals and groups and placed copies in 19 libraries. A copy of the EIS was intended to be sent to the Snake River Alliance on October 25, per their request; however, an error in the distribution of this copy occurred. DOE has corrected the problem and has again sent another copy of the draft EIS to the Snake River Alliance.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	STATEMENT OF PAUL F. WALKER, PH.D. Klein Walker Associates, Inc. 68 Holworthy Street Cambridge, Massachusetts 02138 Telephone: (617) 497-6360 11 November 1983 Mr. M.J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, South Carolina 29801 Dear Mr. Sires: The purpose of this letter is to provide written comments on the draft Environmental Impact Statement, "L-Reactor Operation Savannah River Plant, Aiken, S.C.," dated September 1983. For your information, I am a national security analyst and president of a social science consulting firm, Klein Walker Associates, in Cambridge, MA. For additional personal background, I would refer people to a recent article, "Smart Weapons in Naval Warfare" (Scientific American, May 1983), and a book, <u>Winding Down: The Price of Defense</u> (1st ed: New York Times, 1979; 2nd ed: W.H. Freeman, 1982). I will restrict my comments to the "need" requirement for L-Reactor.	
FC-1	The draft EIS posits in Chapter 1 that L-Reactor is required in order "to increase the supply of weapon-grade plutonium to a level that will satisfy near-term requirements" for modernization and improvement of existing stockpiles as well as for new weapons systems (pp. 1-1 - 1-2). Dr. Robert L. Shoup, author of Chapter 1, explains that these plutonium demands are driven by former President Jimmy Carter's 1980 Nuclear Weapons Stockpile Memorandum (NWSM), later updated by President Ronald Reagan in November 1982. He also states that congressionally delayed or non-funded weapons systems "do not significantly	See the responses to comments BL-16, BL-18, BL-19, and EW-1 regarding need and production alternatives and the scope of this EIS. The Nuclear Weapons Stockpile Memoranda (NWSM) reflect the latest requirements for plutonium; these requirements are based on efforts to modernize and improve stockpiled nuclear weapons and to provide warheads for new weapons systems scheduled for deployment during the next decade. The program to modernize existing weapon systems involves replacing older nuclear

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	change short- and intermediate-term requirements that L-Reactor must help to satisfy" (p. 1-2). Such a cursory explanation for the fundamental rationale behind the restart of L-Reactor is inadequate and must be more fully explained in the final report. Political and military delays and cutbacks, both past and proposed, in the major nuclear weapons programs have been considerable in recent years. They have either not been taken into account here or the NWSM has recently increased its demand for plutonium for existing warhead testing and modernization (as compared to new weapons procurement). There are currently at least nine major nuclear weapons in production (production goals in parens). Three of these are bombs: B-61 Mods 3 and 4 (1000) and B-83 (2500). One is an 8-inch artillery shell: W-79-1 (800). Three are cruise missiles: W-84 GLCM (560), W-80-0 SLCM (758), and W-80-1 ALCM (3500). And two are ballistic missiles: W-85 Pershing II (380) and W-76 Trident C-4 SLBM (1440). There are also at least another six nuclear weapons in RDT&E phases: W-87 MX ICBM (1055), W-87 Trident II SLBM (1440), W-82 155mm artillery shell (1000), W-81 SM-2 ship defense missile (500), and possible anti-submarine and anti-ballistic missile systems (2000±). One of these systems, MX or "Peacekeeper," has been cut back from a projected deployment of 200 missiles carrying 2000 MIRVs to half this number. Several other systems have been delayed in program development and production due to funding, political, and/or technical problems. Defense Department Program Acquisition Reports show, for example, the following five major delays/reductions:	nuclear warheads and existing delivery systems with modern, safer, and more effective warheads. Modernization, in many instances, has led to replacing older warheads that used uranium enriched in the isotope uranium-235 with new warheads that use weapons-grade plutonium.
	<u>Pershing II</u> - Procurement of 91 postponed from FY83 to FY84. <u>Tomahawk SLCM</u> - Procurement reduced in FY82 from 88 to 61 and in FY85 from 120 to 51. <u>ALCM</u> - Procurement reduced in FY 83 from 440 to 330 and cancelled for FY84 and FY85. <u>GLCM</u> - Procurement reduced in FY83 from 110 to 84.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	<u>MX</u> - Procurement reduced in FY83 from 9 to 0.	
		These figures indicate a clear reduction of 1000 warheads and delays of 1-4 years duration of another 1200±. (See <u>Annual Report of the Secretary of Defense, and the Defense Department's Program Acquisition Costs by Weapon System for fiscal years 1980-1984.</u>)
		If the planned production of L-Reactor is plutonium sufficient for 15± warheads annually (as reported by a Department of Energy official, <u>New York Times</u>, January 16, 1983), then it is clear that further evidence is required in order to adequately justify L-Reactor's restart.
		In addition to real past production delays and cancellations of nuclear weapons, the EIS needs assessment must also address itself to arms control and disarmament plans of the current U.S. Administration. This is essential, given the integral nature of arms control to national security and the sensitivity of near- and intermediate-term weapons projections to arms negotiations.
		President Reagan has proposed reducing deployment of Pershing II's and GLCM's in Europe to 420 or less, some 150 less than presently predicted. In strategic arms negotiations, U.S. proposals have included a one-third reduction (about 2500 warheads) in deployed MIRVs and a fifty-percent reduction (about 4000 warheads) in planned cruise missile deployments. In addition, Secretary of Defense Casper Weinberger announced in October, 1983 the withdrawal of about 1400 tactical nuclear weapons from Europe over the next five years.
		Should these reductions, both unilateral and negotiated, be realized, the procurement of nuclear weapons over the next decade may be reduced by as much as 45%. In addition, the availability of weapons-grade material from decommissioned weapons will rise.
		In light of such past program reductions and delays, and of future likely arms control and other drawdowns, the current and

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	future stockpile of nuclear weapons would not be in need of plutonium production capacity of L-Reactor.	
	Sincerely,	
	Paul F. Walker, Ph.D. President	
	PFW/fl	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
M-513	UPDATED STATEMENT OF PAUL F. WALKER, PH.D.	
	Klein Walker Associates, Inc. 68 Holworthy Street Cambridge, Massachusetts 02138	
	14 November 1983	
	Mr. M.J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, SC 29801	
	Dear Mr. Sires:	
FC-2	Please change my 11 November 1983 letter to you regarding the L-Reactor draft EIS as follows: Strike the last sentence on page 2, "President Reagan has....," and insert: "President Reagan has proposed reducing deployment of Pershing II's and GLCM's in Europe to 420 or less, some 150 less than presently predicted."	Comment noted.
	Thank you.	
	Sincerely,	
	Paul F. Walker, Ph.D. President	
	PFW/fi	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF GARY H. WHITAKER, ROBERT H. WHITAKER, AND DOROTHY J. WHITAKER		
U.S. Department of Energy Post Office Box A Aiken, S.C. 29801		
To whom it may concern:		
FD-1	As a citizen of S.C. I must protest the start up of the L-Reactor, since it threatens our environment. I feel we must demand that DOE facilities be required to comply with federal and state environmental standards applicable to commercial reactor sites; and steps be taken to avoid damage to the envi- ronment before startup, regardless of cost.	See the responses to comments AA-3 and AF-2 regarding DOE's commitment to comply with applicable Federal and state regulations and to take all reasonable steps to mitigate impacts, and the response to comment BF-7 regarding the differences between SRP reactors and commercial light-water reactors.
Sincerely,		
Gary H. Whitaker Robert H. Whitaker Dorothy J. Whitaker		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	STATEMENT OF PIXIE A.B. NEWMAN	
	Hydraulics Division Civil and Environmental Engineering Department 1269 Engineering Building 1415 Johnson Drive University of Wisconsin Madison, Wisconsin 53706 November 10, 1983	
	Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, South Carolina 29801	
	Dear M. J. Sires: The enclosed statement is a review of hydrogeologic sections of the Draft Environmental Impact Statement: L-Reactor Operation, Savannah River Plant, Aiken, S.C., V.I and V.II, September 1983 conducted for the Energy Research Foundation, Columbus, S.C. This review is based on the Draft EIS, supplementary references provided to me by the Energy Research Foundation, and on my knowledge of hydrogeology. The review was prepared in consultation with John S. Brasino, a fellow graduate student in hydraulics, and John A. Hoopes, Professor of Civil and Environmental Engineering, at University of Wisconsin-Madison. I am a graduate student in the Hydraulics Division of the Civil and Environmental Engineering Department at the University of Wisconsin-Madison. I have a B.A. in geology from Carleton College in Minnesota, a M.S. in Water Resources Management from the University of Wisconsin-Madison, and a M.S. in Civil and Environmental Engineering from the University of Wisconsin-Madison. In addition, I am an applicant for Engineer-in-Training in the State of Wisconsin and a member of the	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	<i>American Society of Civil Engineers and the American Geophysical Union.</i>	
	I trust these comments will be considered by DOE in preparing the final EIS.	
	Sincerely,	
	Pixie A.B. Newman	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

REVIEW OF THE HYDROGEOLOGY SECTIONS
OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
L-REACTOR OPERATION,
SAVANNAH RIVER PLANT, S.C.

Prepared by
Pixie A.B. Newman

For the Energy Research
Foundation

November 10, 1983

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FE-1	A primary objective of an environmental impact statement is to assess and clearly state the environmental impacts associated directly and indirectly with the proposed project or activity. The sections of the Draft EIS: <u>L-Reactor Operation, Savannah River Plant, Aiken, S.C.</u> devoted to the effects of proposed L-Reactor startup on groundwater resources falls short of this objective. It does not quantify the anticipated effects of the L-Reactor startup on groundwater flow and groundwater quality conditions at the Savannah River Plant (SRP). Although the report recognizes that increased pumpage due to proposed L-Reactor startup will affect the vertical piezometric head relationships between primary on-site aquifers (see p 5-9 and 5-12) and specifies in Table 5-6 (p 5-10 and 5-11) the additional drawdown under seepage basins caused by this pumpage, it does not provide a complete interpretation of the impacts associated with these changes in vertical head relationships on groundwater and surface water flow rates and quality. In addition, I have three major criticisms: 1) current hydrogeologic relationships and groundwater flow rates are not fully presented; 2) original data are not presented in a meaningful and easily digestible manner; and 3) past modeling efforts appear to be inadequate and poorly documented. The following comments are made in relation to criticisms 1) and 2). Although the pre-SRP hydrogeology and hydrogeochemistry of the area was studied and characterized by Siple (1967) using data collected in the 1950s and early 1960s, recent water use and waste management practices have altered the vertical hydrogeologic gradients and groundwater quality in the aquifers at the SRP site. (This is evidenced by Figure 3-11, which shows the piezometric head declines due to increased SRP pumpage, and by the existence of contaminant plumes beneath SRP seepage basins at the M-Area (see Figures F.32 and F.33) and possibly elsewhere.) The magnitude of these effects and future impacts due to the L-Reactor startup cannot be assessed without sufficient, up-to-date, site-specific data. The following information must be included in the EIS:	Section 5.1.1.4 presents a tabulation of the geohydrologic effects, particularly the changes in vertical head relationships, caused by L-Reactor startup, and provides an assessment of the impacts associated with these changes in the quality of ground water. The changes will have very little effect on surface-water flow rates and quality (also see the response to comment DA-8). The central theme of the subsurface hydrology discussions in Section 5 and Appendix F is to provide the current hydrologic relationships and ground-water flow rates. These are fairly well understood throughout SRP. Apparently the comment stems from the belief that the hydrologic system is rapidly changing. This is not the case. Much of the original data is provided in the references given in Appendix F. Further modeling efforts are in progress but it is not anticipated the results will affect the conclusions of the EIS. The need for sophisticated ground-water models for assessing the effects of L-Reactor operation is discussed in the responses to comments EN-47 and EN-49.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FE-2	1) large scale (e.g., an overall scale of 1:48,000 and subarea scale of at least 1:6000) plan with view maps showing: a) the current (1982-1983) piezometric surfaces of each major aquifer present at SRP and surrounding area; b) the locations of data points used to generate these surfaces and the date of water measurement collection; c) the recharge and discharge areas of each aquifer; d) the locations of existing and planned pumping wells and associated cones of depression; e) the locations of active and inactive seepage basins, pits, and landfills; f) the areal extent of contaminant plumes as they presently exist; g) lines showing the locations of cross-section maps provided;	A detailed discussion of the subsurface hydrology at SRP, which is summarized in Section 3.4.2, is provided in Appendix F. Table F-1 of Appendix F has been revised to provide a detailed summary of the characteristics of the hydrogeologic units at SRP. Water table levels and piezometric surfaces for the major aquifers (Congaree and Tuscaloosa) are shown. Water level contour maps and cross sections of shallow aquifers in the vicinity of those waste facilities which will be impacted by L-Reactor startup are also shown. The locations of these facilities are identified on the maps and cross sections provided in the EIS. Additional sitewide information on the waste disposal sites (including active and inactive seepage basins) at SRP is presented in Du Pont (1983; DPST-83-829). This reference contains exact locations of all waste disposal sites, areal extent of contaminant plumes as they have been defined to date, and cross-section maps. A subsequent NEPA review will address the SRP "Ground-Water Protection Implementation Plan," which is currently under review by the State of South Carolina and the U.S. Environmental Protection Agency--Region IV.
FE-3	2) cross-section maps (along and orthogonal to the predominant horizontal flow direction) showing: a) vertical head gradients within and between each aquifer (indicating the name and location of wells used, their screen lengths, and the date of data collection); b) hydraulic head relationships beneath each seepage basin or pit which could be affected by L-Reactor startup (pumpage effects and/or loading effects); c) present and predicted contaminant plume development and migration due to additional pumpage and/or additional loadings to support L-Reactor startup;	Hydraulic relationships for the geologic formations beneath SRP are given in Appendix F. Sufficient information is presented to determine the magnitude of any direct and incremental impacts on those waste facilities affected by resumption of L-Reactor operation.
FE-4	3) mass balance analysis, with estimates of the amount and distribution of recharge to and discharge from the groundwater system (e.g., recharge from rainfall, seepage basins and leakage through confining clay layers and discharge to streams, swamps, pumping wells and leakage through confining layers), based on measured hydraulic conductivities and gradients in confining layers as well as aquifers;	A detailed water budget for all aquifer systems underlying SRP is not considered essential in the evaluation of L-Reactor operation. Sufficient information on rainfall recharge, seepage basin flow paths and travel times, discharges to onsite streams, and ground-water pumpage is presented in the EIS to determine the magnitude of any direct and incremental ground-water impacts resulting from the operation of L-Reactor. An independent NEPA review will address the SRP "Ground-Water Protection Implementation Plan."

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FE-5	4) contaminant mass balance analysis based on mass loadings to seepage basins and contaminant concentrations measured beneath and downgradient of seepage basins.	The seepage basins in L-, F-, H-, and M-Areas will be impacted by L-Reactor operation. The spatial extent of ground-water contamination in the vicinity of these basins is discussed in the EIS. Mass balances are not included because of uncertainties in actual quantities of materials released to the basins in early years of operation. However, the key factors are what species and concentrations have reached the shallow aquifer systems. These data are presented from water quality analyses that have been made (Section F.5).
FE-6	The Draft EIS contains general statements regarding flow directions, general recharge and discharge areas, and relative permeabilities but the specific, support data are often lacking, particularly when representing the hydrogeology of clays. The Draft concludes that "only in the M-Area where downward flow paths are known to exist is there significant potential for water table discharges to reach the major regional aquifer (the Tuscaloosa)" (p 3-32). The underlying premise is that vertical recharge into the Tuscaloosa does not and will not occur in the L or other L support areas and that on-site contamination of shallow aquifers does not constitute a significant environmental impact. The omission of a thorough assessment of these impacts is contrary to the philosophy and purpose of an EIS. The characterization of shallow aquifer contamination must be expanded.	The fact that there is interest in protection of the regional aquifer (Tuscaloosa) should not be interpreted to mean that the shallower sediments are neglected. The EIS provides an extensive discussion of potential impacts to the shallow ground waters beneath the SRP from the operation of L-Reactor. An assessment of impacts to surface-water quality and dose commitments for liquid releases following a shallow ground-water to surface-water path are presented in the EIS (Sections 4.1.2.3, 5.1.1.2, and 5.1.2).
FE-7	As presently written, the Draft EIS contains some contradictory data and/or figures and leads the reader to believe that the quality of the Tuscaloosa aquifer (outside the M-Area) is protected from contamination due to the "extensive upward vertical gradient between the Tuscaloosa and the Congaree hydrostratigraphic units and the impermeability of the green and pisolitic clays. In addition, the report claims that the Tuscaloosa and Congaree aquifers discharge into the Savannah River and that this discharge prevents potentially contaminated waters, originating on-site, from causing off-site contamination of the Tuscaloosa aquifer in Georgia. This statement seems to ignore the off-site effects of discharges into and transport downstream in the Savannah River.	Although seepage basins have been in service at SRP since the mid-1950s, drinking water from the Tuscaloosa wells in the central portion of SRP has never been found to be contaminated by radionuclides or by chlorinated hydrocarbons. Thus, the combination of hydrostratigraphic characteristics and upward head differential in this area of the SRP are effective in protecting the Tuscaloosa Aquifer. As discussed in response to comment EN-24, the basal clay of the Congaree and upper clay of the Ellenon form an effective confining unit throughout the SRP for the sands in the underlying Tuscaloosa Aquifer. Most recent testing of A- and M-Area wells suggests that chlorinated hydrocarbons in the contaminated Tertiary sediments have migrated into the annulus of wells producing from the Tuscaloosa and that the contamination reported earlier was not from generalized contamination of the Tuscaloosa. The contaminated production wells have been shut down.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FE-8	Data presented in Figure 3-8 show that upward vertical gradients are, at least locally, being significantly reduced due to present pumping practices. Pumpage in the H-Area has reduced the vertical head difference between the Tuscaloosa and the Congaree to less than or equal to 0.6 m (2.0 ft). Figure 3-9 (p 3-29), which is supposed to show the 1982 vertical head difference between the Tuscaloosa and the Congaree, misrepresents the magnitude of this difference at the H-Area.	The depression in ground-water head due to discharge in the Savannah River valley prevents ground water from moving from South Carolina to Georgia through a ground-water pathway. It is well recognized that the Savannah River is a ground-water sink (Sections F.2.3 and F.4).
FE-9	Insufficient data limit the reader's ability to assess the accuracy of this figure in other areas at the SRP. Figure 3-9 (also Figure F-29) was not generated from data collected at nested observation wells which measure piezometric head at 2 or more depths within each hydrostratigraphic unit; instead, it was generated by subtracting one interpolated piezometric surface (Figure F-18) from another (Figure F-9). The credibility of this figure is further weakened by the fact that data used to generate the 2 original piezometric surface maps were "somewhat sparse" (p F-71). Nevertheless, this figure is included in the Draft EIS anyway, thus perpetuating the possible misconception that the Tuscaloosa groundwater is protected. In the text, the figure is improperly used to assess the actual vertical head difference between the Congaree and the Tuscaloosa. Clearly, the magnitude and the horizontal domain over which the upward vertical gradient exists and will continue to exist after L-Reactor startup needs to be better documented. Similarly, the protective powers provided by "impermeable" green and pisolitic clays, which do not impede downward flow in the M-Area (see Figure F-11) and are purported to impede flow elsewhere, need to be quantified. Furthermore, the hydraulic conductivity of these clay layers may be reduced by organic solvents and other seepage chemicals and these effects need to be examined.	It is true that the head in the wells in Figure 3-8 of the draft EIS shows a 0.6 m head difference but these wells are within the line of depression of the H-Area production wells. Figure 3-9 of the draft EIS shows the regional pattern of head relationships without including the details of the several areas of depression which are generally small in area. This is why Figure 3-9 was constructed by subtracting the contours in Figure F-18 from those in Figure F-9.
		As mentioned in the response to comment FE-8, Figure 3-9 was constructed to portray the regional nature of the head relationships. Clusters of piezometers do not exist on a regional basis although wells have been drilled in certain operating areas for special studies. Additional monitoring wells to provide broader regional coverage are planned.
		The data for Figures F-18 and F-9 of the draft EIS are sparse but they have been separated on an aquifer basis in order to provide a better understanding of geohydrology than previous authors. As an example, it is better to have fewer data points for the Tuscaloosa than to mix heads from the shallower Tuscaloosa with those from the deeper Tuscaloosa Aquifer. Thus, it is believed that these maps more accurately depict the head in these aquifers than previous maps. These maps are included because they represent the most advanced understanding of the hydrogeologic system and not to "perpetrate a possible misconception."
		Protection of the Tuscaloosa Aquifer is discussed in the response to comment FE-7.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FE-10	The hydrogeologic data collected to generate the areal and cross-section maps should provide enough information upon which modeling efforts may be based (criticism 3). At the very least, a mass balance relating inflows, outflows, and aquifer storage should be developed for each aquifer. Past modeling efforts referred to in the EIS were limited in scope, focusing solely on a 2-dimensional representation of the Tuscaloosa aquifer. As could be discerned from available documentation (Marine and Routt, 1975), little effort was made to determine the seepage or leakage between the Congaree and the lower Ellenton and Tuscaloosa aquifers. Groundwater flow at the SRP occurs within and between multiple hydrostratigraphic units. Piezometric head relationships change both horizontally and vertically. Hence, models of this area's hydrogeology must attempt to accurately represent the entire 3-dimensional system.	A detailed discussion of the hydrogeologic properties of the subsurface units at SRP is provided in Appendix F; this information is summarized in Section 3.4.2. For the previous modeling of the Tuscaloosa a two-dimensional model was adequate for the desired objectives. It has been recognized since 1975 that to model the entire geohydrologic system, a three-dimensional model is required. SRP began to develop a code for that purpose in 1975. However, the USGS made available a three-dimensional code in 1973 which has been used for specific modeling in operating areas. Two-dimensional modeling of the relation between Tuscaloosa water levels and ground-water withdrawal has been performed; this is described in this final EIS in Section F.4.2 and in the appropriate section of Volume 1. A regional model of the entire geohydrologic system at SRP has been initiated. The need for sophisticated ground-water models for assessing the effects of L-Reactor operation is discussed in the responses to comments EN-47 and EN-49.
FE-11	Given sufficient hydrogeologic data, predictions of groundwater flow conditions and contaminant transport impacts can be assessed under the new environmental stresses associated with the L-Reactor startup. In addition to the information previously noted, an adequate environmental impact statement must include: 1) a comparison of flow rates beneath seepage basins before and after additional L-Reactor support pumpage; 2) contaminant plume development and migration before and after L-Reactor support loadings; and 3) groundwater contaminant discharge rates to creeks and the Savannah River before and after L-Reactor startup.	A discussion of the hydrologic characteristics of the different water-bearing formations are discussed in Section 3.4.2 and Appendix F. Additional information on the current knowledge of the areal extent and characteristics of the known contaminant plumes are discussed in Du Pont, 1983; DPST-83-829. The impact on the known source areas in L-, F-, H-, and M-Areas and in the burial grounds are discussed in Sections 4.1.1.3, 4.1.2, 5.1.1.2, 5.1.1.4, and 5.1.2.1. Ground-water travel times from seepage basins to on-site streams are discussed in the response to comment EN-44.
FE-12	From the little data presented in the Draft EIS, it appears as though continued and increased loadings from the L-Reactor startup will contribute to the development and migration of the contaminant plumes below several of the active seepage basins. Conceivably, effects of additional L-Reactor pumpage may induce flow and spread contamination away from inactive as well as active waste sites. There is little doubt that L-Reactor startup will accelerate contamination problems in the F- and	As discussed in Sections 4.1 and 5.1, impacts to the different aquifer systems beneath L-, F-, H-, and M-Area seepage basins due to L-Reactor operation are expected to be small. This assessment is based on the existing physical models provided by the F- and H-Area basins, and SRP burial ground plumes and extensive studies of the movement of radioactive materials in the ground water and their contribution to onsite streams. Section 5.1 has been expanded to include a more thorough discussion of

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	H-Areas (nitrates and mercury) and in the M-Area (degreaser solvents - tetrachloroethylene, trichloroethylene, and 1,1,1-trichloroethane).	the chlorinated hydrocarbon contamination in M-Area, the protection of public health and active program for the clean-up of this contamination. This topic is also discussed in the response to comment FE-13, below. Also see the response to comment FE-1.
FE-13	Groundwater contamination by chlorocarbons in the vicinity of the sewer line and the seepage basin in the M-Area is very serious and efforts are being made to cleanup and contain this contamination. Since the efficiency of M-Area cleanup activities has yet to be demonstrated, it remains to be seen whether further contamination associated with L-Reactor startup will cause more extensive <u>post-cleanup</u> groundwater contamination. However, by all accounts, the additional L-Reactor loadings will increase short-term and may potentially increase long-term groundwater contamination at the M-Area.	The L-Reactor incremental discharge to the M-Area settling basin is expected to be at most 0.12 cubic meter per minute; thus additional ground-water impacts from incremental M-Area operations in support of L-Reactor will be minor. The ground-water contamination currently found in the vicinity of M-Area is confined to the Tertiary age formations which are not very transmissive due to the interbedded and intercolated nature of the sediments. Horizontal flow velocities are slow, on the order of 7.6 meters per year. None of the contaminants have migrated off the plant site and no immediate offsite hazard exists. The vertical gradients from the Tertiary formations to the Tuscaloosa Aquifer are downward in the M-Area vicinity. Additional withdrawals from the Tuscaloosa as a result of L-Reactor would increase this gradient only slightly. Current plans call for discontinuing the use of M-Area seepage basin by April 1985 and constructing a process wastewater treatment facility (Section 5.1.1.2). Remedial action to remove the ground water which contains hydrocarbons from beneath M-Area has begun and will reduce the potential for further contamination of the aquifer systems in the area. Also see the response to comment DA-4.
	In summary, the Draft EIS representation of present hydrogeologic conditions and groundwater environmental impacts associated with L-Reactor startup is inadequate. The potential for significant groundwater contamination due to L-Reactor startup exists. An assessment of the seriousness of these impacts cannot be determined from the data provided in the Draft EIS document. The EIS must include the results of studies to:	
	1) develop a sound basis of comparison for impact assessment, -- fully characterize present groundwater flow relationships and quantify flow rates (see listing on page 2 for information required), take out all old and possibly misleading data, comment on seasonal effects and on the existence of the Millet fault	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	and its effect on groundwater discharge rates; -- fully characterize the extent of present groundwater contamination in shallow as well as deep aquifers (see listing on page 2); 2) conduct mass balance analysis for waters in each aquifer and for each contaminant plume identified; 3) make predictions of environmental impacts of L-Reactor startup on groundwater flow rates and quality, base predictions on mass base calculations, supplement these with 3-D model predictions if possible.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
References:		
1)	Faye, R.E., and D.C. Prowell, 1982. "Effects of Late Cretaceous and Cenozoic Faulting on the Hydrology of the Coastal Plain near the Savannah River, Georgia and South Carolina," <u>U.S.G.S. Open-File Report 82-156</u> , U.S.G.S., Doraville, Georgia, 80p.	
2)	Marine, I.W. and K.R. Routt, 1975. "A Groundwater Model of the Tuscaloosa Aquifer at the Savannah River Plant," <u>Savannah River Laboratory Environmental Transport and Effects Research Annual Report-1974</u> , DuPont, Savannah River Laboratory, Aiken, S.C., 10p.	
3)	Siple, G.E., 1967. "Geology and Ground Water of the Savannah River Plant and Vicinity, South Carolina," <u>U.S.G.S. Water-Supply Paper 1841</u> , U.S. Government Printing Office, Washington, D.C., 113p plus plates.	
4)	U.S. Department of Energy, 1983. <u>Draft Environmental Impact Statement: L-Reactor Operation, Savannah River Plant, Aiken, S.C. V.I and II.</u>	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF THE HONORABLE JOE FRANK HARRIS Office of the Governor Atlanta, Georgia 30334 November 9, 1983 Mr. M. J. Sires, III Assistant Manager for Health, Safety, and Environment Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801 Dear Mr. Sires: This will acknowledge the receipt of the Draft Environmental Impact Statement DOE/EIS - 0108 D, for the L-Reactor Operation at the Savannah River Plant. We appreciate the opportunity to review the document and provide comments on this important proposed action. As you will recall, the State of Georgia's position which was presented at the February 9, 1983 field hearing in North Augusta, South Carolina addressed three areas of importance to our State. The first issue contained in my position statement is our opposition to the bedrock storage of high level nuclear waste at the Savannah River Plant. Our concern in this area has been mitigated by the Department of Energy's assurance at that hearing that the concept has been dismissed and will not be reactivated again in the future.		
FF-1	The second issue contained in our position statement is the recommendation that the Department of Energy should identify and submit for public review the cumulative effects of all the present and proposed facilities at the Savannah River Plant including the contiguous commercial operations. In reviewing the Draft Environmental Impact Statement for the L-Reactor we note that Section 5.2, entitled "Cumulative Impacts," is presented. However, the substantive information contained therein is insufficient to project the total combined environmental contamination levels during and after operational periods.	The cumulative radiological effects of all nuclear facilities expected to be operating within an 80-kilometer radius of L-Reactor are presented in Section 5.2.6 of the EIS. This analysis includes a tabulation of offsite doses (Table 5-19 of the draft EIS) and expected offsite concentrations of radio-nuclides in air, milk, and water (Table 5-20 of the draft EIS). Source terms for L-Reactor and associated support facilities are given in the EIS. Source terms for other nuclear facilities are not listed in the EIS to avoid overburdening

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	(See attached comments.) Therefore, this section needs to be strengthened in the final document to provide an adequate assessment of contaminant levels.	the average reader with details but are provided in the following documents: - o Savannah River Plant - Average of 1978, 1979, and 1980 releases published in the Annual SRP Environmental Monitoring Reports, i.e., DPSPU-79-30-1, DPSPU-80-30-1, and DPSPU-81-30-1. - o Fuel Materials Facility-SRP - Environmental Assessment, Naval Reactor Fuel Materials Facility, U.S. Department of Energy, DOE/EA-0170 (1982). - o Defense Waste Processing Facility-SRP - Environmental Impact Statement - Defense Waste Processing Facility - Savannah River Plant, U.S. Department of Energy, DOE/EIS-0082 (1982). - o Vogtle Nuclear Power Plant - Final Environmental Statement - Alvin W. Vogtle Nuclear Plant, U.S. Atomic Energy Commission (1974).
FF-2	A third area discussed in our February 9, 1983 position statement relates to the thermal aspects of the discharge from the L-Reactor.	Section 4.4.2 of the EIS, which discusses cooling-water mitigation alternatives, has been revised based on public comments received on the draft EIS. Specifically, Section 4.4.2 has been revised to provide a detailed discussion of additional combinations of various cooling-water systems. In Section 4.4.2, each of the cooling-water mitigation systems is evaluated for attaining the thermal discharge limits of the State of South Carolina. Section 4.4.2 and a revised Appendix I, Floodplain/Wetland Assessment, discuss the wetland impacts of each of the systems considered. The Department of Energy has been reviewing and evaluating alternative cooling-water systems for L-Reactor. Based on these reviews and evaluations, and consultations with representatives of the State of South Carolina regarding a mutually agreed upon compliance approach, a preferred cooling-water mitigation alternative is identified in this EIS. This preferred cooling-water alternative is to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in the lake. The Record of Decision prepared by the Department on this EIS will state the cooling-water mitigation measures that will be taken which will allow L-Reactor operation to be in compliance with the conditions of an NPDES permit to be issued by the State of South Carolina.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FF-3	We continue to view this as a matter between the State of South Carolina and the Department of Energy. Georgia will continue to support South Carolina's efforts to ensure protection of valuable groundwater resources of the region. We urge the Department of Energy to move forward expeditiously with the various studies, including groundwater contamination, that have been agreed to with South Carolina.	As noted in the opening remarks to the public hearings on the L-Reactor EIS, the DOE is committed to (1) an expanded program of sitewide ground-water monitoring and study; (2) the involvement of the State of South Carolina in onsite and offsite ground-water monitoring activities; and (3) mitigative actions at SRP to reduce pollutants released to the ground water and to establish with the State of South Carolina a mutually agreed-on compliance schedule. Current plans call for discontinuing the use of the M-Area seepage basin before April 1985 and constructing a process wastewater-treatment facility (Section 5.1.1.2.). The phaseout of the seepage basins in F- and M-Areas is planned for late 1988; the phaseout of the low-level waste burial ground is planned in the late 1990s. The "SRP Ground-Water Protection Implementation Plan" was recently developed to examine strategies and schedules to implement mitigative actions required to protect the quality of the ground waters beneath SRP. Implementation of mitigative actions would be accomplished under DOE's Resource Conservation and Recovery Act requirements, and would be compatible with the State of South Carolina's hazardous-waste management regulations. This action plan will be the subject of a separate NEPA review (Section F.6). The State of South Carolina and Federal agencies are reviewing plans for impeding the growth of the contaminant plume and the removal of the chlorinated hydrocarbons using a combination of recovery wells, a large air stripper, and injection wells and/or a spray irrigation system. A pilot air stripper is currently operating in M-Area. In addition, the health of onsite personnel will be protected by changes in the water distribution system, which will obtain potable water only from the A-Area Tuscaloosa wells, which are unlikely to receive contamination from Tertiary aquifers.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	In conclusion, please be assured that we intend to continue working with the Department of Energy staff in a cooperative manner to ensure adequate protection of our environmental resources. In moving forward to accomplish this objective, we look forward to the inclusion of a thorough and more detailed cumulative effects section in the Final Environmental Impact Statement.	
	With kindest regards, I remain,	
	Sincerely,	
	Joe Frank Harris	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATE OF GEORGIA'S REVIEW COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE L-REACTOR OPERATION		
FF-4	1. In Section 5.2, "Cumulative Impacts", radiological source terms (release rates in Curies per year) are not presented for any of the facilities listed. The absence of release rate information prevents thorough technical review of this Section.	See the response to comment FF-1.
FF-5	2. The incremental radiological release data presented in Tables 4-10, 4-11, 5-7, 5-8, 5-9, and 5-10 for L-Reactor and support operations appear to be inconsistent in several cases with earlier release data presented in the SRP Annual Reports. For example, Tables 4-11, 5-7, and 5-9 show incremental Co-60 releases to surface streams of 7.8×10^{-2} Curies while Table 42 of the 1982 SRP Annual Report (DPSPU 83-30-1) shows that the total Co-60 release from the entire SRP operation was 1.1×10^{-4} Curies in 1982.	Cobalt-60 releases to streams were based on 1978, 1979, and 1980 operating experiences, adjusted to reflect the planned mode of operation in L-Reactor. Releases of radiocobalt in 1979 were higher than average for SRP (0.41 curie) and dominate the average for the 3-year period. Releases in both 1981 and 1982 were below the 3-year average.
FF-6	3. Section 5.2, "Cumulative Impacts", does not address the discharge of non-radioactive wastes to the environment, yet Table 5-1 presents incremental non-radioactive releases to on-site seepage basins. It is difficult to assess this incremental information on its own merit. The release of non-radioactive wastes from current SRP operations should be addressed in this Section. Also, the Summary (page S-5) states that use of the M-Area seepage basin will be discontinued by March 1985. Information should be presented in the final EIS for the projected disposal of chemical and radiological wastes after that date.	Incremental releases of non-radioactive releases to the environment as the result of operation of SRP facilities supporting L-Reactor are discussed in Section 5.1.1.2. All non-radioactive discharges from SRP will meet the conditions set forth in an NPDES permit issued by the State of South Carolina. Closure of the M-Area seepage basin by April 1985 is discussed in Sections 5.1.1.2 and 5.1.1.4. As noted in Section 5.1.1.2, process wastewater from M-Area will, after treatment, be released to surface waters in accordance with the limits of an NPDES permit. DOE plans to conduct a separate NEPA review of the ground-water protection program and thermal mitigation of currently operating reactors (K and C). Additional information on the NEPA review of the "SRP Ground-Water Protection Implementation Plan" is provided in Section F.6 of the FEIS.
FF-7	4. In Table 2-2, the DEIS states that about 80,000 Curies of radioactivity, primarily tritium, will be released annually to the atmosphere from L-Reactor. This figure does not account for the incremental increase in discharges from L-Reactor support operations. For example, the total radioactive release for tritium (H-3), Kr-85, and Ar-41 from current operations,	Table 2-2 of the draft EIS lists releases to the atmosphere only from L-Reactor. Atmospheric releases from support operations are listed in Table 5-10 of the draft EIS. It is true that the total amount of H-3, Ar-41, and Kr-85 expected to be released from L-Reactor plus support operations will be about 280,000 curies. The total of these three radionuclides for

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	not including the L-Reactor, to the atmosphere is about 1,000,000 Curies per year. With the addition of the L-Reactor and incremental support operations the total release of radioactivity for these same three radionuclides will increase to 1,280,000 Curies per year.	current SRP operations (average of 1978, 1979, and 1980) was approximately 900,000 Ci, for an overall total from SRP of about 1,170,000 Ci.
FF-8	5. Several of the radionuclides, presented in Tables 4-11 and 5-8, which are discharged into seepage basins in liquid form are volatile. No information is presented in the DEIS concerning the atmospheric release of radionuclides such as iodine from the seepage basins.	Of the radionuclides released to seepage basins (Tables 4-11 and 5-8 of the draft EIS), only tritium and I-131 are normally volatile. The evaporation of tritium oxide to the atmosphere is accounted for in the EIS. Since very small amounts of I-131 are to be discharged to seepage basins, volatilization of a small fraction was not accounted for because of its insignificant contribution to offsite dose.
FF-9	6. In Section 3.7.1.2, the DEIS states that recent on-site monitoring showed Cs-137 levels in soil up to 53 millicuries per square kilometer. Table 13 of the 1982 SRP Annual Report shows Cs-137 levels on SRP property of up to 109 mCi/km ² compared to a background level at 100 miles radius of 36 mCi/km ² . This report also shows Pu-238 and Pu-239 levels on SRP property which are significantly higher than background levels. The final EIS should contain a discussion of the impact the L-Reactor and support operations will have on these levels in soil. The effects of long-term deposition and rainwater wash-off of these materials need to be discussed.	Doses related to airborne radioactive releases from L-Reactor and its support facilities are described in the EIS, as is the remobilization of cesium-137 and cobalt-60 in Steel Creek. L-Reactor lies in the Steel Creek watershed. Washoff of radionuclides, which may exist in L-Area and the Steel Creek watershed as a whole, has resulted in very minor cesium-137 transport, typically less than 0.25 curie per year including cesium-137 remobilized in Steel Creek. This release would result in a dose to the hypothetical maximally exposed individual of less than 0.2 millirem per year.
		Levels for fallout radioactivity are measured annually in soil from onsite and offsite. Fallout concentration measurements vary from year to year because samples are not obtained from the exact same location each year and because of the inhomogeneous nature of the soils. Table 14 of the 1982 SRP environmental monitoring report (a summary of 10 years of soil analysis data) shows the extent of this variability. Section 3.7.1.2 of the EIS will be changed to show that the average of onsite Cs-137 deposition (1976-1982) is 50 millicuries per square kilometer. The average deposition offsite was 48 millicuries per square kilometer during this same period. The years 1976-1982 were selected to calculate the average because the data for this period all represent analyses of 5-cm depth soil cores. Cs-137 of onsite soils is not expected to differ significantly from offsite soils because only about 2.5 curies

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		have been released to the atmosphere from SRP since startup and would not be a measurable increase above the estimated deposition of about 80 curies from weapons test fallout on the plant site (104 millicuries fallout per square kilometer). On the other hand, Pu-238 and Pu-239 levels on the SRP site are higher than offsite as shown in Tables 13 and 14 of the 1982 site report. This is to be expected because the 0.7 curie of Pu-238 and 3.0 curies of Pu-239 released since plant startup is larger than the estimated deposition of about 1.6 curies of weapons test Pu-239, 240 fallout per square kilometer. Most of the plutonium releases at SRP occurred prior to 1970. Releases to the atmosphere in recent years have made an insignificant contribution to either the onsite or offsite soil inventory. Likewise, the operation of L-Reactor and support operations will have an insignificant effect on levels of these radionuclides in soil. The effect of rainwater washoff of radionuclides deposited from weapons test fallout and prior SRP releases is not an effect of the proposed restart of L-Reactor and is beyond the scope of the EIS. Measurements of environmental Cs-137, Pu-238, and Pu-239 are reported in the annual SRP environmental monitoring report.
FF-10	7. No monitoring data are presented to support the assessment of individual and population doses due to the commercial harvest of fish and shellfish (Section 5.2, Appendix B). Due to the long life-span of such fish as American Shad and Striped Bass, as well as their positions in the food chain, DOE needs to make a commitment in the final EIS to initiate a sampling program to determine the levels of radionuclides and other potentially toxic chemicals in these fish.	The comprehensive monitoring programs for SRP are summarized in Chapter 6 of the EIS and in the publicly available annual monitoring report <u>Environmental Monitoring in the Vicinity of the Savannah River Plant</u>. DOE has initiated a program to obtain commercially important fish and shellfish for radiological analyses.
FF-11	8. In the discussion of the "Radiation Environment" (Section 3.7) several data concerning the average annual whole body doses due to fallout (external exposure, inhalation, ingestion of food and water) are presented. The final EIS should also present the concentrations of radionuclides in the environment leading to these exposures. (mCi/km² deposition for external radiation, Ci/m³ in air for inhalation dose, pCi/g in food products, and pCi/l for water and milk).	Information on the dose to individuals from weapons test fallout (Section 3.7) was included in the EIS to help characterize the radiation environment in the vicinity of the Savannah River Plant. Doses given for fallout are typical for this latitude and were obtained from the reference given [Sources and Effects of Ionizing Radiation, United Nations Scientific Committee on the Effects of Atomic Radiation (1977)]. More detailed data on local fallout measurements are given in the annual SRP environmental monitoring reports. The most recent report in this series, for 1982, is DPSPU-83-30-1.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FF-12	9. In section 5.2.4.2, the DEIS states that Plant Vogtle will discharge blowdown water through a diffuser to the river. This statement is incorrect. Plant Vogtle will not use a diffuser but will use a single point discharge pipe. (Georgia Power Company, Vogtle Electric Generating Plant - Operating License Stage Environmental Report (VEGP-OLSERT) Section 3.4.5). This may or may not impact the conclusion reached in the DEIS related to the interactions of the Vogtle and SRP thermal plumes.	This statement has been corrected and will not impact the conclusion concerning interrelations of the Vogtle and SRP thermal plumes.
FF-13	10. In the discussion of alternatives to the discharge of waste-water to the L-Area seepage basin, it is stated that "The values presented in Table 4-38 are only those associated with disassembly basin purge water and do not include releases from other sources such as heat exchanger leakage, process sumps, and evaporative loss from process water leaks." The values presented in Table 4-38 are identical to the values presented in Table 4-11 for liquid releases to the L-Area seepage basin due to all L-Reactor operations. Is one then to assume that all liquid releases other than disassembly basin purges will be direct to Steel Creek? If this is not the case, then the other releases to the seepage basin should be factored into the release calculations. If it is the case, it should be clarified that all liquid releases other than disassembly basin purges discharge directly to Steel Creek.	As noted in the first paragraph of Section 4.1.2.2 of the draft EIS, radioactive materials will be discharged in liquid effluents from L-Reactor to Steel Creek during normal operation of the reactor. Sources of these discharges include small process leaks into the cooling water discharge and releases to the process sewer. Only disassembly basin purge water is discharged to the seepage basin. The doses presented in Section 4.1.2 include these sources as well as radionuclides reaching the creek via a ground-water path from the L-Reactor seepage basin. Table 4-38 of the draft EIS repeats information contained in Table 4-11 to provide a ready reference in Section 4.4.3 to the radiological source term associated with the L-Area seepage basin.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF THE HONORABLE RICHARD L. OTTINGER		
U.S. HOUSE OF REPRESENTATIVES SUBCOMMITTEE ON ENERGY CONSERVATION AND POWER OF THE COMMITTEE ON ENERGY AND COMMERCE WASHINGTON, D.C. 20515		
November 14, 1983		
The Honorable Donald P. Hodel Secretary Department of Energy Forrestal Building 1000 Independence Avenue, S.W. Washington, D.C. 20585		
Re: Comments on the Department of Energy Draft Environmental Impact Statement on L-Reactor Operation, Savannah River Plant (DOE/EIS-0108D)		
Dear Mr. Secretary:		
My comments will be confined to the issue of assurance of the safety of the proposed reactor operation, raised by DOE's departure from its established, long-standing policy to operate its nuclear facilities in conformance with applicable regula- tions for commercial nuclear facilities.		
FG-1	The operations of nuclear facilities for defense purposes are not regulated by the laws or regulations which apply to commer- cial nuclear facilities, or the workers' health and safety pro- tections of the Occupational Safety and Health Administration. This exception for defense-related nuclear facilities is granted because these facilities are owned by the U.S. govern- ment, through the Department of Energy, and because the Depart- ment, and its predecessors, have had a long-standing commitment to operate its nuclear facilities in conformance with appli- cable environmental and safety regulations for commercial	The restart of L-Reactor will be in compliance with all appli- cable Federal and state environmental protection regulations. As noted in the comment, L-Reactor is excluded from NRC licens- ing requirements in accordance with Section 110(a) of the Atomic Energy Act, as amended. DOE is responsible for regu- lating the health and safety programs for its facilities. The radiation protection standards of DOE are comparable to those established by the NRC (10 CFR 20) for a production facility (i.e., 500 millirem to the whole-body in any one calendar year). In addition, like the requirements of NRC, the engi- neered safety features of SRP reactors are based on the need to limit potential radiological consequences in the event of an accident.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FG-2	nuclear facilities. This arrangement has proven to be useful in meeting the needs of all concerned. National security information is guarded, public health and safety is assured to approximately the same level of risk from commercial reactors, and operational information useful to both the Nuclear Regulatory Commission and the Department of Energy can be easily exchanged. In my view, the continued commitment of the Department to the policy of conformance to the spirit, if not the letter, of commercial regulation, is vital to the continuation of this policy and in this instance, to health and safety of the people of South Carolina. To date, the Department has had a relatively successful nuclear program. However, now when the commercial nuclear industry is attempting to recover from the Three Mile Island accident and indictments, and the widespread concern over quality assurances, it is not the time to depart, or appear to depart from the Department's commitment to safe operation of its nuclear facilities. In this context, it is difficult to conceive of the Commission sanctioning the operation of a 2350 MWT reactor (DEIS, Vol. 1, p. 2-14) in the absence of a containment or confinement system as an independent and final barrier to the release of airborne radioactivity in the event of a severe accident. Regulations adopted in 1962, applicable to both commercial and defense-related facilities regarding site suitability and reference dose values, require the identification of three tables (10 CFR 100). The first establishes the "source term", or the amount and composition of radioactivity which may be released in a severe accident; the second is meteorologic data and site configuration to determine atmospheric dispersal; and the third would establish the prospective dose which could be absorbed by an individual at the site boundary.	DOE has not departed from its prior commitment to safe operation of its nuclear facilities. L-Reactor is equipped with a confinement system which, coupled with the large plant site, effectively mitigates the consequences of all credible reactor accidents. The confinement system filters all air leaving the reactor building; it traps particulates and radioiodine in the event of an accident. Although noble gases and tritium would not be trapped, the offsite radiation doses would be within the dose guidelines (10 CFR 20 if it were to apply). The dose would represent a very low risk to the public health and safety as a result of both the confinement system and the long distance to the plant boundary.
FG-3	Since these figures, particularly the source term, are the basis for the safety evaluation of the reactor, it is particularly important to clearly establish how these figures were selected and justified. Of great concern to me is the statement that "no mechanisms have been identified that will cause a reactor accident resulting in core damage (fuel melt) greater than 3 percent." (DEIS, Appendix G, p. 3) This assumption is	The source term used for evaluation of the L-Reactor confinement system was established in accordance with the requirements of 10 CFR 100. This requirement of the NRC does not assume or require that the source term be based upon the assumption of a full-core meltdown; instead, 10 CFR 100 clearly states that the source term be based on an accident that "would result in potential hazards not exceeded by those from any accident

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	crucial to finding that only small amounts of radiation could be released, and therefore, to DOE's assertion that additional containment or confinement technology is not needed, since it would provide only a small increment of containment.	considered credible." The 3-percent core-melt accident was selected as the appropriate accident for comparison to 10 CFR 100 dose criteria because it is a major accident, postulated from the consideration of known possible accident events, that would result in potential hazards not exceeded by the hazards of any other accident considered to be credible. The statement quoted from page G-3 of the DEIS is incorrect. The statement has been corrected in this final EIS to read "No credible accident sequences have been identified that will cause a reactor accident resulting in core damage greater than 3 percent." Accident sequences that potentially could result in more than 3-percent core melting have been identified; however, such sequences have been judged to not be credible initiators based upon over a 100 years of SRP reactor operation and over 30 years of research and development specific to the safety of SRP reactors.
FG-4	This assumption is a radical departure for DOE. In the past, for other Savannah River heavy water production reactors, and even for the Clinch River Breeder Reactor, DOE has utilized the usual source term for light water reactors--based on an assumption of 100 percent core damage. (Memorandum from W.S. Durant to E.C. Nelson, "Proposed Containment Shell for Building 105-C," Tech. Div. Savannah River Laboratory (SRL), DPST-64-423, Jan. 29, 1965; Roger E. Cooper and Bernard C. Rusche, "The SRL Meteorological Program and Off-Site Dose Calculations," SRL, DP-1163, Sept. 1968; Memorandum from S.P. Tinnes to G.F. Merz, "Airborne Activity Confinement System Base Case Design Basis Accident," Tech. Div. SRL, DPST-79-441, July 19, 1979; "Site Suitability Report in the Matter of Clinch River Breeder Reactor Plant," NUREG-0786, June 1982, p. 111-8.) A full discussion of the explanation and justification for this radical departure from usual DOE practice is necessary in the DEIS. I am aware of the research programs underway to reevaluate the source term at the NRC, but as yet it is my understanding that these studies have not indicated the need for revision.	The use of a 3-percent core-melt accident for assessing the adequacy of the confinement system relative to 10 CFR 100, is not a departure from past practice, but it is consistent with past practices. It is also consistent with respect to the requirements of NEPA in not including the impacts of speculative information or potential impacts with an extremely low probability of occurrence.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Such a discussion of the selection of a new source term is a necessary prerequisite to evaluating the conclusion that additional containment is not necessary, or that the national security needs for additional plutonium and tritium production are sufficient to overcome the need for new containment or confinement technology due to time constraints.	
FG-5	Alternative materials production options identified in the DEIS appear to be sufficient to provide needed materials pending the 36 months necessary for the addition of a containment or confinement mechanism from the options identified in Table 4-31. (See testimony of Dr. Thomas B. Cochran, at DOE Public Hearings, November 3, 1983.) The five month schedule advance achieved by the Purex processing facility at the Hanford site occurred after the preparation of the DEIS. This advance contributes nearly one-half of the amount of materials expected to be needed but not produced if the L-Reactor restart were delayed the 36 months required for containment/confinement installment. In summary the DEIS is defective in that it inadequately addresses or justifies a radical departure from estimates of a maximum credible accident and source term description. This unjustified departure leads DOE to the as yet unwarranted assumptions regarding the need for radionuclide containment or confinement technologies. Finally, if DOE were to find that additional containment or confinement technologies are required, sufficient options have been identified in the DEIS or are available due to the five month schedule advance for start-up of the Purex facility that has been achieved that national security needs could still be met. The DEIS should be revised to address these concerns. Sincerely, Richard L. Ottlinger Chairman	Alternative material production options are not sufficient to provide needed nuclear weapon materials. Specific response to the suggestions of Dr. Cochran, including the impact of the early restart of the PUREX facility and the viability of delaying restart of L-Reactor, are contained in this appendix for comment letter "BL."

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF R. LEWIS SHAW, P.E. South Carolina Department of Health and Environmental Control 2600 Bull Street Columbia, S.C. 29201 November 14, 1983 Mr. M.J. Sires Assistant Manager for Health, Safety and Environment DOE, Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801 Re: Comments on draft EIS. Dear Mr. Sires: This office has completed its review of the Draft EIS for restart of L-Reactor, dated September 1983. In this connection, the Department offers the following comments from various program areas for your consideration. <u>Bureau of Solid and Hazardous Wastes Management.</u>		
FH-1	1. Page 4-22. A permit should be required for disposal of sludge from the sanitary waste treatment plant in the sludge pit near Central Shops area. I assume no other waste is handled here.	The disposal of sludge from the sanitary waste treatment plant is covered under the Clean Water Act. The sludge pit was in operation in 1979 when a construction permit was requested from SCDHEC under the provisions of the Clean Water Act. A resubmittal of this permit request was made in early 1984.
FH-2	2. Page 4-37. Are any liquids handled in the low level waste burial area? Radiological Health should be directly involved with this area in light of their experience at Chem-Nuclear in Barnwell.	No liquids containing radioactivity are buried in the low-level-waste burial ground.
FH-3	3. Page 5-4. It appears from ground-water monitoring data that the seepage basins in the F and H areas (fuel fabrication) have already contaminated ground water above IPDWS for Hg. These basins are under interim status as hazardous waste	The State of South Carolina has been notified about the nature and extent of ground-water contamination resulting from the use of seepage basins in F-, H-, and M-Areas. A ground-water monitoring report is submitted quarterly to SCDHEC. In

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	facilities. Owners and operators of such facilities are required to: a. Notify, in writing, the State within seven (7) days of such finding; b. Determine the cause, if possible, and; c. Determine the extent or potential of contamination and discontinue operation until the Department determines what action is to be taken. In light of the above, the Department cannot concur with any incremental increase of Hg levels in the ground water. The EIS states that the increased level of Hg in the ground water is estimated to be 0.008 ppm.	addition, SCDHEC has just completed its review of the SRP "Ground-Water Protection Implementation Plan." This action plan will be the subject of a separate NEPA review. The continued use of the F- and H-Area seepage basins is being evaluated and this topic will be covered in the separate NEPA review of the SRP "Ground-Water Protection Implementation Plan." Also see the responses to comments DA-6 and DA-7.
FH-4	4. Page 5-6. Coal ash disposal activities should be permitted by the State. <u>Bureau of Radiological Health.</u> Paragraph 4.1.2.1	Coal ash disposal activities are regulated by the Resource Conservation and Recovery Act of which activities controlled by the Atomic Energy Act are exempt. Therefore, these activities are not subject to state permitting under RCRA. Also see the response to comment FH-1. DOE practices will be compatible with SC requirements.
FH-5	It is stated that there will be "more frequent" target discharge from the L-Reactor than from the other operating reactors. Will the increased activity make a qualitative difference in the level of safety of the reactor operations? Has the increased level of operations been reflected in the dose projections given in Appendix B? In particular, is it reflected in the incremental effects of the L-Reactor compared to the overall emissions of the Plant? Paragraph 4.1.2.2	More frequent target discharges anticipated from L-Reactor (Section 4.1.2.1 of the EIS) will not make a difference in the level of safety of reactor operations. The releases of radioactivity from L-Reactor and associated support facilities are based on the planned operating mode of the reactor. Dose projections in Appendix B are based on these anticipated releases and are reflected in the incremental effects of L-Reactor as compared to the overall emissions of the plant.
FH-6	Has any consideration been given to reducing the discharge of tritium from the discharge basins into Steel Creek? What are the alternatives?	The source of most of the tritium expected to be discharged from L-Reactor to seepage basins is the purge water from the disassembly basin. The disassembly basin is the location where fuel and target elements are temporarily stored following discharge from the reactor. Tritium and other radionuclides are carried into the disassembly basin as process water adhering to fuel and target assemblies and as water of hydration in aluminum oxide on the assemblies. DOE has implemented measures to minimize carryover of contaminated moderator to the disassembly basin.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
		Alternative methods of disposal of disassembly basin water are described in Section 4.4.3 of the EIS. The methods considered were: - o Discharge to seepage basins - o Direct discharge to Steel Creek - o Evaporation of tritium to the atmosphere - o Detritiation of reactor moderator, the source of the tritium.
	Paragraph G.4.1.19	
FH-7	Have any modifications to the fuel charging and discharging machine been required as a result of the recent incident during which an irradiated fuel element was stuck between the reactor and the discharge canal for several hours? Are the conclusions of this section still valid?	No modifications were made; none were required. The safety system functioned as designed. The conclusions in the section are valid.
	Paragraph G.5.5	
FH-8	Are the Pillinger and Marter (1982) dose conversion factors comparable to the dose conversion factors in Reg Guide 1.109? Are they comparable to other standard dose conversion factors?	The dose conversion factors of Pillinger and Marter (1982) are the same as those described in Reg. Guide 1.109. However, the factors were obtained from a more recent Nuclear Regulatory Commission publication, i.e., G. R. Hoenes and J. K. Soldat, "Age-Specific Radiation Dose Commitment Factors for a One-Year Chronic Intake," U.S. Nuclear Regulatory Commission NUREG-0712, (1977).
	Paragraph H.2	
FH-9	Have the size and shape of ingestion planning zones been calculated?	The ingestion pathway EPZ discussion has been expanded in the EIS. The zone now includes a corridor 2 km wide down the Savannah River, the Port Wentworth water service area, the Savannah River delta and the Beaufort-Jasper Counties Water Authority area (essentially all of Beaufort and Jasper Counties).
	The State will determine what areas should be included in any emergency planning zones in order to provide a level of protection which is comparable to that provided by EPZs around commercial power plants. Given that State agencies have no direct control over Plant operations, we are necessarily dependent on	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	information from Plant officials in order to determine a basis for planning and to recommend protective actions in the event of an accident. Will a fifty-mile ingestion EPZ provide an adequate margin of safety? Appendix J	
FH-10	The list of Studies in Progress includes several issues which have concerned the Department. What progress has been made toward installing systems to reduce or prevent emissions of noble gases? Are methods to reduce tritium releases available? What alternatives exist to the present system of discharge to Steel Creek (and other Plant streams)?	Alternatives to improve the existing SRP airborne activity confinement system are discussed in Section 4.4.1 of the EIS. Studies in progress for all the alternatives except low temperature adsorption are aimed at the development of more accurate cost estimates and measures of effectiveness of the alternatives. Experimental research is in progress to determine the effectiveness and feasibility of the low temperature adsorption technique. Approximately two years will be required to complete the experimental program. A moderator detritiation facility to reduce tritium releases is discussed in Section 4.4.5 of the EIS. In Section 4.4.4, alternative disposal methods for disassembly basin purge water are discussed. Alternatives include direct discharge to seepage basin, evaporation, discharge to Steel Creek, and moderator detritiation.
	Conclusion	
FH-11	The Draft EIS contains information about the release of radioactive material from routine operations and from accidents. The analysis of projected doses to members of the public is consistent with similar calculations of the Bureau. On the other hand, there is less information to compel the conclusion that the proposed action can only be done in one way. The Bureau concurs that the operations, as described, will probably not result in excessive exposures outside the Plant boundary, although we are not convinced that further reductions are impossible.	Further reductions are always possible at some price, e.g., dollars, efficiency, and production. All timely, cost-effective alternatives have been considered in preparing L-Reactor for operation.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	<u>Bureau of Water Pollution Control.</u>	
FH-12	1. The direct discharge to Steel Creek (reference case) is and would continue to be a thermal violation of the State water quality standards. 2. The once-through spray canal system would result in cooling the discharge by only 3°C (5.4°F) before entering Steel Creek. This system would cause a thermal violation of the State water quality standards in Steel Creek. Wetlands and habitat would still be reduced, as per the direct discharge. 3. The small impoundments-rubble dams system utilizes a series of small dams on Steel Creek for cooling and, hence, is no different from the direct discharge alternative except that the water is cooler by the time it reaches the Savannah River Swamp. Water quality standards would still be violated in Steel Creek. Habitat reduction would be significant. 4. The small impoundments - 500-acre lake system would utilize larger lakes on Steel Creek than the rubble dam alternative but the water quality standards would be violated in Steel Creek. Habitat reduction would be significant. 5. Once-through cooling by diversion to Pen Branch would result in no thermal impact upon Steel Creek. However, it would impact the upper unaffected reaches of Pen Branch. This would "solve" L-Reactor's problem in regard to Steel Creek but it would just transfer to another creek system. Water quality standards would be violated in Pen Branch. 6. The lake-canal diversion to Pen Branch would use a lake on Steel Creek for first cooling, then send it over to Pen Branch. Water quality standards would be violated in Steel Creek and Pen Branch. Lake temperature would be greater than 90°F. 7. The 500-acre lake or rubble dams combined with spray cooling would still use Steel Creek for cooling purposes and water quality standards would be violated in Steel Creek.	Section 4.4.2 of the EIS, which discusses cooling-water mitigation alternatives, has been revised based on public comments received on the draft EIS. Specifically, Section 4.4.2 has been revised to provide a detailed discussion of additional combinations of various cooling-water systems. Section 4.4.2, each of the cooling-water mitigation systems is evaluated for attaining the thermal discharge limits of the State of South Carolina. Section 4.4.2 and a revised Appendix 1, Floodplain/Wetland Assessment, discuss the wetland impacts of each of the systems considered. The Department of Energy has been reviewing and evaluating alternative cooling-water systems for L-Reactor. Based on these reviews and evaluations, and consultations with representatives of the State of South Carolina regarding a mutually agreed-upon compliance approach, a preferred cooling-water mitigation alternative is identified in this EIS. This preferred cooling-water alternative is to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in the lake. The Record of Decision prepared by the Department on this EIS will state the cooling-water mitigation measures that will be taken which will allow L-Reactor operation to be in compliance with the conditions of an NPDES permit to be issued by the State of South Carolina.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
8.	The mechanical draft recirculating cooling towers alternative would not meet the 90°F stream temperature limit, thus, water quality standards would be violated in Steel Creek. But it does appear that a cooling tower combined with a spray canal system alternative (not evaluated) would meet State standards. The delta 5°F criteria might not be met though, owing to the flows involved.	
9.	The cooling tower (once-through) with pipeline to the Savannah River Swamp (Steel Creek Delta) alternative could be an approvable alternative in that water quality standards would be met and only a "minor" impact on wetlands would occur.	
10.	Recirculation through creation of L-Pond would use Steel Creek for cooling purposes and would violate the State water quality standards.	
11.	Recirculation through KAL Pond created by the damming of Steel Creek, Pen Branch, and Indian Grave Branch would still violate water quality standards for these streams.	
12.	Recirculation through creation of High-Level Pond would involve the damming of Pen Branch and would violate water quality standards in the stream and have a discharge from the pond of higher than 34°C (94°F).	
13.	Recirculation through PAR Pond would lead to increased thermal stress on the fish in PAR Pond and increase its summer temperature to over 90°F, thus violating water quality standards.	
14.	The direct discharge with fish management alternative "writes off" Steel Creek and simply uses restocking Savannah River fish as a means of replacing the Steel Creek environment.	
15.	Direct discharge with power reduction would still lead to <u>minimum</u> discharge temperature of 40°C (104°F) to Steel Creek. Water quality standards would be violated.	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	If you have any questions regarding these comments, please contact us.	
	Very truly yours,	
	R. Lewis Shaw, P.E. Assistant Deputy Commissioner Environmental Quality Control	

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

STATEMENT OF JAMES A. TIMMERMAN, JR.

South Carolina
Wildlife & Marine
Resources Department

November 14, 1983

Mr. M.J. Sires, III
Assistant Manager
Health, Safety & Environment
Department of Energy
Savannah River Operations Office
P. O. Box A
Aiken, S. C. 29801

Re: Draft EIS - L-Reactor Operation, Savannah River
Plant, Aiken, S.C.

Dear Mr. Sires:

Personnel of the South Carolina Wildlife and Marine Resources
Department have reviewed the Draft Environmental Impact
Statement - L-Reactor Operation, Savannah River Plant and offer
the following comments.

The Draft EIS adequately describes the existing environmental
conditions and the expected impacts on fish and wildlife
resources from the restart of the L-Reactor. These impacts are
summarized as follows:

-withdrawal of 4% of the average annual riverflow, and
7% of the 7-day, 10-year low flow of the Savannah
River.
-entrainment of 7.7 million fish eggs and 7.6 million
fish larvae annually.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	destruction of approximately 730 acres of wetland habitat in Steel Creek and the Savannah River swamp. an additional loss of 7 to 10 acres of wetland annually. growth of the Steel Creek delta at a rate of 3 acres/year. restricted access by fishes to approximately 2,500 acres of wetlands as a result of the thermal plume. release of radiocesium to the aquatic environment and the potential contamination of downstream fish, shellfish and other organisms. Thus, it is apparent from the data presented in the DEIS that the restart of the L-Reactor as proposed will have a significant adverse impact on fish and wildlife resources in the project vicinity.	
FI-1	The DEIS states that "Studies during the last two decades have indicated that no major changes in aquatic species in the Savannah River have occurred as the result of operations of SRP." The studies conducted by the Academy of Natural Sciences of Philadelphia and reported in <u>Thermal Effects on the Savannah River</u> (October 23, 1981), state that "from this study of the species which have been collected since 1951 in the vicinity of the Savannah River Plant, there was no definite evidence that the addition of heat, either by Four Mile Creek or by Steel Creek, has been detrimental to the aquatic communities at our Stations 3 and 5. Because each of these stations were located about 6 miles downstream from the source of heated effluent (Four Mile Creek and Steel Creek), the effects of the heated plumes were not studied. The stations were beyond the area where a plume effect might have been damaging." The report also found that there were substantial shifts in aquatic species at the sampling stations during the course of the study,	Aquatic ecological monitoring studies have been expanded to include areas and quantitative studies of representative aquatic species. These studies are described in Chapter 6 of the EIS. In addition, further studies will be implemented as part of the comprehensive cooling-water program.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	but that these shifts could not be definitely related to impacts caused strictly by temperature effects. It also appears that no evaluation was made of potential impacts on population levels of important aquatic species.	
FI-2	When the cumulative impacts of the SRP operations are considered, the populations of aquatic organisms could be adversely impacted. Approximately 19% of all fish eggs and larvae passing the SRP intakes would be entrained and destroyed. Approximately 1,600 acres of wetlands in the corridors of the thermally impacted streams would be adversely impacted, as well as 5,000 acres of the adjacent Savannah River swamp. Therefore, the extent of the adverse impacts on fish and wildlife resources is much greater when the entire SRP operations are considered.	The cumulative effects of all SRP operations are addressed in Sections 5.2.4 and 5.2.5 of the EIS. DOE is conducting thermal mitigation studies to select cooling-water systems for the currently operating SRP reactors (K and C) to effect mitigation of the environmental effects of thermal discharges from these reactors.
FI-3	The DEIS considers the restart of the L-Reactor, as scheduled, to be the only viable alternative that will produce the quantity of weapons material desired on the time schedule desired. We do not feel that this is a proper approach to the evaluation of potential alternatives, and more consideration should be given to the other production alternatives.	Section 2.1 describes production options to the L-Reactor; this section has been expanded. The DOE has analyzed all possible full-production options; basically, the only option to the L-Reactor to produce equivalent amounts of plutonium is another production reactor. Existing production reactors were considered, as was a new production reactor. A new production reactor was dismissed because it would have no effect on the near-term need for plutonium, which the L-Reactor restart will satisfy. In addition to full-production options, Chapter 2 also analyzes partial-production options (1) from the standpoint of offsetting the plutonium production that would be lost if the L-Reactor restart is delayed because mitigation alternatives are being implemented and (2) as an alternative to the L-Reactor itself. The potential combinations of partial-production options that provide the greatest material production still provide only a small fraction of the needed defense materials that could be produced by L-Reactor.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FI-4	A number of alternatives were presented as possible mitigation measures for the adverse impacts resulting from the restart of the L-Reactor. However, it is clear that these mitigation alternatives are intended to be after-the-fact measures to compensate for resource losses. We believe that they should be given full consideration as means of avoiding adverse impacts prior to the restart of the L-Reactor. While a variety of possible mitigation measures are discussed, the DEIS does not propose that any of these alternatives be implemented. In fact, we do not believe that any of the presented alternatives will adequately mitigate for wetland and fish and wildlife losses resulting from the restart of the L-Reactor with once-through cooling as proposed.	Section 4.4.2 of the EIS, which discusses cooling-water mitigation alternatives, has been revised based on public comments received on the draft EIS. Specifically, Section 4.4.2 has been revised to provide a detailed discussion of additional combinations of various cooling-water systems. In Section 4.4.2, each of the cooling-water mitigation systems is evaluated for attaining the thermal discharge limits of the State of South Carolina. Section 4.4.2 and a revised Appendix I, Floodplain/Wetland Assessment, discuss the wetland impacts of each of the systems considered. The Department of Energy has been reviewing and evaluating alternative cooling-water systems for L-Reactor. Based on these reviews and evaluations, and consultations with representatives of the State of South Carolina regarding a mutually agreed upon compliance approach, a preferred cooling-water mitigation alternative is identified in this EIS. The Record of Decision prepared by the Department on this EIS will state the cooling-water mitigation measures that will be taken which will allow L-Reactor operation to be in compliance with the conditions of an NPDES permit to be issued by the State of South Carolina.
FI-5	Therefore, we would have to recommend that an appropriate cooling-water alternative (i.e., cooling towers, etc.) be implemented prior to the restart of the L-Reactor as a means of avoiding the adverse impacts on fish and wildlife resources and that appropriate fish stocking be conducted to mitigate for fishery losses from entrainment and impingement. Sincerely, James A. Timmerman, Jr. Executive Director JATjr/sa	Comment and recommendation noted. The Record of Decision prepared by DOE on this EIS will state any mitigative measures, including cooling-water mitigation alternatives, that will be taken. DOE has committed to attain acceptable compliance for all major thermal discharges at SRP.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

STATEMENT OF DR. E. W. MURBACH

I am Wesley Murbach. I am a resident of Aiken.

Based on what you said, my comments are probably not really in order. However, it is my understanding, from what we've said earlier, that the L-Reactor has been operated for years, so we should have a good idea what the environmental impact is. Therefore, I think this document (indicating) is far more than adequate.

Comments noted.

I'd just like to go on record as a taxpayer that I think we spent far too much money on this sort of thing. I realize I'm probably a voice crying in the wilderness, but as to the credentials, I was involved in our environmental study in 1947, so I feel I know something about the environment, too.

Thank you.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF BRUCE BLANCHARD		
United States Department of the Interior Office of the Secretary Washington, D.C. 20240 ER-83/1211 Nov 28 1983 Assistant Manager for Health, Safety and Environment Savannah River Operations Office Aiken, South Carolina 29801 Dear Mr. Sires: Thank you for the letter of September 12, 1983, transmitting copies of the Department of Energy's (DOE) draft environmental impact statement for the L-Reactor Operation, Savannah River Plant (SRP), Aiken County, South Carolina. Our comments are presented according to the format of the statement or by subject. <u>Fish and Wildlife Resources</u> FK-1 The draft statement clearly and accurately addresses baseline fish and wildlife resource conditions and anticipated individual and cumulative adverse impacts arising from the base case and a host of alternative measures. It is clear that the identified preferred alternative, operating L-Reactor with direct discharge of cooling water into Steel Creek and subsequent mitigation measures, will result in significant impacts to fish and wildlife resources. <u>Thermal Effects and Mitigation</u> FK-2 The draft statement acknowledges on pages 4-8 to 4-10 that the effects of releasing hot cooling water to Steel Creek at		
		Section 4.4.2 of this final EIS has been revised to provide a discussion of a number of additional combination of potential thermal mitigation measures. Based on the review and evaluation of these alternatives, and consultations with representatives of the State of South Carolina regarding a mutually agreed upon compliance approach, a preferred cooling-water mitigation alternative is identified in this EIS. This preferred cooling-water alternative is to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in the lake. The Record of Decision on this EIS will state any mitigation measures that will be taken prior to or after the restart of L-Reactor. See the response to comment FK-1.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	temperatures ranging up to 80°C (176°F) and at a rate of about 12 times its natural average flow would eliminate this stream and its associated wetlands as a living environment as far down-stream as the Savannah River. We concur with the conclusion on page 4-12 that, among the alternatives considered, complete recirculation through cooling towers would be preferred. This alternative would reduce both the temperature and quantity of flow discharged to Steel Creek to within the non-lethal range and would also avoid resuspension and transport of radiocesium to the Savannah River.	The Record of Decision prepared by the Department of Energy on this final EIS will consider a number of factors in reaching a decision on the implementation of a specific thermal mitigation measure. These factors will include the impacts from thermal discharge as well as costs and the need for defense nuclear materials. The restart of L-Reactor will comply with the conditions of an NPDES permit issued by the State of South Carolina, and radioactive releases from L-Reactor will meet DOE radiation protection standards that are comparable to those of NRC (10 CFR 20) for a production facility (i.e., 500 mrem to the whole body in any one calendar year).
FK-3	The other alternatives, which would not reduce temperature and quantity of flow at the point of discharge to the environment, would simply shift the lethal effects to other streams and apparently would be more expensive than cooling towers.	A number of factors are delineated in this EIS with respect to thermal mitigation measures. The information provided demonstrates that the sum of the capital, operating/maintenance, and power loss costs averaged over a 20-year period for lakes with spray cooling and the diversions to Pen Branch, for example, are less than half of those for cooling towers. The cooling-lake alternatives, which would afford some protection to wetlands and fisheries and reduce the transport of radiocesium, are less costly in comparison with cooling-tower options.
		The diversions to Pen Branch are the only two thermal mitigation alternatives considered in this EIS that would divert the thermal discharge to another stream. These two alternatives are markedly less expensive than cooling towers having complete recirculation.
FK-4	The likelihood of the seasonal occurrence of fog and/or any other micro-climatic changes caused by the direct discharge of the heated cooling water into Steel Creek should be presented in the final statement.	Section 4.4.2 of the EIS has been modified to reflect the maximum range of range of fogging, icing, and salt deposition conditions resulting from cooling tower blowdown. These impacts are minor and bound similar effects from the other cooling-water alternatives.
FK-5	The draft statement does not clearly indicate the range of mitigation alternatives being considered as "subsequent mitigation measures under DOE's preferred alternative." If only the "other alternatives" listed in Section 4.4.2.4 are candidates for subsequent mitigation (i.e., thermal cogeneration, low-head hydropower, modified reactor operation, fish management and/or restocking programs, protection of similar wetlands, or support	In the draft EIS the reference to "subsequent mitigation measures" was intended to reflect <u>all</u> of the thermal mitigation measures in Section 4.4.2 (i.e., alternative cooling-water systems and other alternatives). This reference has been clarified in the final EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	of fisheries research), then adequate compensation for lost resources would not be available. Should the range of "subsequent mitigation measures" be wider in scope than indicated above, certain of the predicted impacts could be reduced in the long-term. For example, switchover to full recirculation cooling towers would indicate wetland recovery again and reduce impingement and entrainment. However, a direct discharge restart, even with implementation of this environmentally "best" subsequent mitigation measure, would result in immediate loss of 15 years of post-recovery succession in the Steel Creek system. It also would add to the permanent impact associated with delta growth. Scoured sediment from Steel Creek would be deposited over wetlands, increasing elevations and changing substrate types, such that post-shutdown recovery would not necessarily reflect pre-operation communities or values.	The EIS presents the predicted impacts of implementing the thermal mitigation measures either prior to or after the restart of L-Reactor. Implementation of a cooling-water mitigation system after the restart of L-Reactor identifies the loss of the post recovery succession in Steel Creek in the EIS. Some increased sedimentation from flow effects would occur and primarily effect the rate of delta growth. Implementation of an alternative cooling-water system after the restart of L-Reactor would again allow successional recovery of impacted areas.
FK-6	Certain of the mitigation options presented in the draft statement do not conform to the Fish and Wildlife Service's Mitigation Policy as published in the Federal Register on January 25, 1981. The policy establishes four resource categories to establish mitigation levels consistent with the fish and wildlife resource values involved. The floodplain habitat to be impacted by the L-Reactor restart falls into Resource Category 2 as habitat "of high value for evaluation species and is relatively scarce or becoming scarce on a national basis or in the ecoregion section." The mitigation goal for this category calls for no net loss of in-kind habitat value. None of the replacement mitigation alternatives which include restocking impacted fish species, protecting wetlands similar to the Steel Creek Swamp system, and conducting or supporting fisheries research meet the stated mitigation criteria. However, certain of these mitigation options, particularly restocking of impacted fish species, would be a viable option to pursue as mitigation for the projected impingement and entrainment impacts.	The Fish and Wildlife Service's Mitigation Policy provides a framework for mitigation recommendations by Service employees. This policy does not preclude or condition the "balancing" of potential environmental consequences and other considerations by other Federal agencies in their decisions based on NEPA documentation. To ensure that the Department of Energy in reaching its Record of Decision on this EIS is aware of the Service's classification, this final EIS has been modified to include appropriate statements that the floodplain habitat to be effected is considered by the Service to be a Resource Category 2. Also see the response to comment FK-1.
FK-7	Therefore, we do not concur with the preferred alternative of operating L-Reactor with direct discharge of cooling water into Steel Creek and subsequent mitigation measures. The fish and wildlife resource impacts associated with this alternative are clearly identified in the draft statement and include the loss of 1,000 acres of wetlands and associated functions and increases in impingement and entrainment of Savannah River fishes.	See the response to FK-1 regarding cooling-water mitigation alternatives.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FK-8	We recommend the complete recirculation of cooling water through mechanical-draft cooling towers which is identified in the draft statement as the "preferred alternative to minimize the adverse environmental effects of use of river water, impact of thermal effluents, loss of habitat and wildlife, water contamination and loss of archeological resources."	The recommendation is acknowledged. The direct discharge of cooling water as documented in the EIS is not expected, however, to result in the loss of archeological resources. Also see the response to comment FK-2.
FK-9	We strongly recommend this alternative coupled with interim implementation of the two most efficient partial options (accelerated use of the Mark 15-lattice at SRP and production of 5 percent plutonium-240 at N-Reactor) as the only alternative that would avoid significant environmental damage before start-up.	The partial production options, or combinations of options, can neither provide the needed defense nuclear materials requirements nor fully compensate for the loss of the material that would be produced by L-Reactor.
FK-10	If, however, DOE retains their selected alternative because of documented overriding national security concerns, then we request that they develop an appropriate plan to mitigate project impacts. We recommend that DOE contact the Field Supervisor, Charleston Field Office, Fish and Wildlife Service, Post Office Box 12559, Charleston, South Carolina 29412 (803-724-4707; FTS 677-4707) to discuss and develop a mitigation plan.	The Department of Energy is cooperating with the Fish and Wildlife Service to develop a Habitat Evaluation Procedure (HEP) plan for the Steel Creek system with the implementation of the preferred thermal mitigation system for L-Reactor. The HEP will identify the value of habitat to be gained or lost with implementation of the preferred L-Reactor cooling-water alternative for use in assessing further mitigation. If required, DOE will implement additional mitigative measures that might be identified through the HEP process dependent on Congressional authorization and appropriation.
<u>Groundwater Contamination</u>		
FK-11	It is stated on page 4-55 that an analysis has been made of the consequences of a class 9 accident; i.e., one having low probability but potentially great severity. The analysis was reportedly made on a basis comparable to that currently used to assess such accidents for light-water reactors. However, the results of the analysis as reported in the environmental statement (App. G) do not include the potential for a meltdown of the core through the basement of the reactor. If such an	Reference Durant and Brown (1970), cited on page 4-45, provides an "Analysis of Postulated Core Meltdown of an SRP Reactor." This reference specifically addressed on page 60 the possible minor penetration of concrete floor surface and demonstrated that no significant depth of concrete floor would be penetrated. In particular, partial cooling of any molten fuel mass at elevation - 40 ft could be provided by five separate systems identified on page 35 of Durant and Brown (1970), and would preclude the possibility of penetrating the concrete basement floor.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	occurrence is even remotely possible, the statement should evaluate potential groundwater impacts and their mitigation. If such an event is completely impossible, this should be stated.	These systems include the confinement heat removal system installed in 1979 as noted in Appendix J.
FK-12	A scoping letter by Alfred H. Vang, Executive Director of the South Carolina Water Resources Commission, on page K-127, refers to the existence of a large number of wells on the project site prior to the establishment of the SRP. Mr. Vang writes that the current status of these wells is unknown; there is concern that if they were improperly sealed, they might provide avenues through which contaminants could move from shallow water-bearing zones into the major aquifers at greater depths. Our review of the environmental statement has not revealed a response to this concern. The statement should adequately address the current status of the pre-project wells and evaluate the potential for related groundwater impacts.	The text of Section 3.4.2.3 has been modified to reflect this concern.
FK-13	It is stated on page F-88 that uranium found in the contaminants of the M-Area seepage basin will require about 700 years to reach groundwater. The analyses of Tables F-14 and F-15 indicate that mercury and nitrate have already reached groundwater in appreciable amounts. The statement should discuss the ultimate fate of the uranium, mercury, nitrate and other significant constituents such as lead that may reach groundwater later.	Chapter 5 of the EIS has been modified to provide a clearer discussion of the incremental releases from support facilities of radioactive and nonradioactive discharges to the F-, H-, and M-Area seepage basins. With respect to the M-Area settling basin, present discharges to the settling basin will be discontinued by April 1985, and will instead be treated by a wastewater treatment plant in accordance with a State of South Carolina NPDES permit. The migration of mercury and nitrate is different than that for uranium. The quantities of uranium in the soils of the M-Area do not migrate in the same manner as nitrate and are expected to become associated with the clay materials in the subsurface because of its relatively high distribution coefficient. Ultimately the uranium is likely to reside in the basal Congaree and upper Ellenton clay units, which are thick, effective confining units throughout the SRP. The small quantities of mercury and lead, and the quantities of nitrate that may reach the water table will be removed by interceptor/recovery wells as part of the planned remedial action program for the M-Area.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses														
FK-14	The total groundwater flux through the SRP area is said to be about 100 cubic meters per minute, which is about 1.7 times the sum of any projected use for L-Reactor and the current use in the area (page 4-7, page F-71 and F-72). The statement should make clear how much of the total flux is actually available to wells without having significant effects on regional water levels and surrounding well use - particularly downgradient wells. Hydrographs of Tuscaloosa and Ellenton wells on page 3-35 suggest a fairly close correlation between increases in withdrawal rate at SRP and water-level trends. We suggest that the impact analyses should project areally extensive declines in water levels that will result from increased withdrawals and predict where water levels will eventually stabilize.	The FEIS has been revised to reflect current SRP ground-water pumpage from the Tuscaloosa, as well as incremental and cumulative use projections (Appendix F, and Chapters 4 and 5). In 1982 the SRP withdrew about 23.8 cubic meters per minute; in 1983 this value increased to 27 cubic meters per minute. Process water conservation practices and the placing of facilities on stand-by will reduce the SRP withdrawal rate to about 25.4 cubic meters per minute including pumping in L-Area and incremental pumping at facilities supporting L-Reactor operation. If L-Reactor was placed on stand-by approximately 4.9 cubic meters per minute used in support of L-Reactor operation would not be required. When the DWPF and FMF are operational the total withdrawal rate by SRP is expected to increase to about 26.4 cubic meters per minute. This compares to a value of 37.8 cubic meters per minute suggested by Siple (1967) suggested as a practical upper pumping limit for 1960 wells when SRP was pumping about 18.9 cubic meters per minute. For conservatism, the ground-water flux through the Tuscaloosa at and adjacent to SRP is estimated to be 51 cubic meters per minute, the lower bound estimate of Marine and Routt (1974). In 1983, ground-water withdrawal within their study area was about 38.5 cubic meters per minute (11.5 from offsite users and 27.0 from SRP) which is about 75 percent of the estimated flux. Thus, pumping at SRP does not appear to be depleting the Tuscaloosa Aquifer, but rather water levels are responding to pumping by developing a new equilibrium piezometric surface. Also see the responses to comments AJ-1 and BT-7.														
FK-15	The sorptive properties of sedimentary materials beneath the SRP are said to mitigate impacts of radionuclides moving through these materials (e.g., page B-31). The statement should discuss ion-exchange capacities and other pertinent properties of the various types of sediments, indicating typical values or ranges of values. In addition, previous operations have provided sufficient history of radionuclide movement at the SRP so that the significance of the sorptive capabilities of the sedimentary materials in place can be assessed separately from the mere retarding influence of groundwater flow; this distinction will be significant in anticipating delayed impacts.	Based on studies on SRP seepage basins, measured distribution coefficients (K_d) of elements in typical SRP soils are: <table><tr><th>Element</th><th>K_d</th></tr><tr><td>Sr</td><td>100</td></tr><tr><td>Cs</td><td>730</td></tr><tr><td>U</td><td>60</td></tr><tr><td>Pu</td><td>1400</td></tr><tr><td>Am</td><td>1000</td></tr><tr><td>Cm</td><td>1000</td></tr></table>	Element	K_d	Sr	100	Cs	730	U	60	Pu	1400	Am	1000	Cm	1000
Element	K_d															
Sr	100															
Cs	730															
U	60															
Pu	1400															
Am	1000															
Cm	1000															

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FK-16	Low concentrations of chlorinated solvents have been found in a Tuscaloosa water production well (page 5-6). High concentrations have been found in the shallower groundwater of the M-Area (pages F-88 through F-90). Mitigation at present consists of pumping the contaminated water from the shallower aquifers and using a pilot airstripper facility to improve the groundwater quality. The efficiency of this method, probable degree of recovery of contaminated groundwater and potential for increasing concentrations of the chlorinated solvents in the Tuscaloosa aquifer should be assessed.	For other elements, where K_d values are not available, K_d is conservatively assumed to be zero (i.e., elements will not be retarded by ion exchange and will move at the velocity of ground water). Ground-water velocities in the vicinity of SRP seepage basins typically range from 0.15 to 0.30 meter per day and distances to outcrop areas range from 365 to 1220 meters. The remedial action program for the M-Area consists of nine 200-foot deep interceptor/recovery (I/R) wells and an air stripper with a capacity of 1.5 cubic meters per minute, about 1.8 times that of the current discharges to the M-Area settling basin. This system is expected to remove about 30 tons of chlorinated hydrocarbons per year during the first few years of operation; thereafter the removal rate will decrease as the contaminant concentrations decrease. The cone of depression resulting from pumping by the I/R system will be extensive. For example, the area within the 3 meter drawdown isopleth is expected to have an area of several hundred acres after 10 years of pumping. The remedial action program is designed to prevent and eliminate any significant concentrations of chlorinated hydrocarbons in the Tuscaloosa Aquifer. Both the State of South Carolina and the EPA are actively involved in the review of ground-water protection measures including the remedial action program at SRP. The ground-water protection program will be the subject of a separate NEPA review.
FK-17	<u>Radioactive Releases to Streams</u> We found no mention of the possibility of severe leaks in the heat exchangers in the discussion of accidents. Small leaks of reactor process water into the once-through cooling water in the heat exchangers are stated to be the cause of routine radioactive releases to Steel Creek (page 4-25). This raises the question of whether severe leaks are also possible and, if so, whether they could occur coincidentally with any accidents affecting the core and the reactor process water. In any case, accidental releases of radionuclides in liquids discharged to Steel Creek should be discussed and the maximum quantities that could enter the Creek should be estimated. Although the resulting immediate dose may be smaller than that due to airborne emission, the release of long-lived radionuclides to streams	Severe leaks of moderator to the cooling-water in the heat exchangers can be readily detected by redundant radiation detectors on the effluent side of the heat exchangers. If abnormal radiation levels are detected, the reactor would be shutdown for remedial action. The remaining heat exchangers (total of 12) would provide sufficient capacity to remove decay heat.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	will be a matter of continuing concern for years after the event (as in the earlier releases of radiocesium) and should not be overlooked.	
	<u>Confinement</u>	
FK-18	In general the subject of confinement versus containment systems for the L-Reactor is not within our expertise; however, one subject is significant to groundwater resources. This is the retention of particulate matter and radioiodine, for which the proposed confinement system is said to have an efficiency of more than 99 percent. If this efficiency can be preserved during and following the most severe accident possible, we have no adverse comment. The confinement heat-removal system also provided should aid in protecting groundwater by ensuring the efficiency of the airborne-activity confinement system and controlling to some extent radioactive fluids.	The efficiency of the confinement system can be preserved during and following the most severe accident possible, in particular because of the Confinement Heat Removal System which was installed in 1979 as noted in Appendix J. The operability of the confinement system has been evaluated extensively in Durant, et al. (1966) and Durant and Brown (1970) as noted on page 4-45 of the draft EIS. The probability of fission product release in conjunction with an inoperable confinement system, estimated on page 47 of Appendix G, is considered so low as to exclude it from detailed analysis in the EIS.
	<u>Specific Comments</u>	
FK-19	2.1.3. Information regarding the relative deficiency in production of needed nuclear materials by use of the combination of two partial options (accelerated use of the Mark 15-lattice at the Savannah River Plant (SRP) and production of 5 percent plutonium-240 at N-Reactor), as compared with L-Reactor, is needed to provide a better base from which to judge these production options. If this is not classified information, a percentage figure of projected material production deficiency should be presented here.	Qualitative and limited information on the need for weapons-grade plutonium is presented in Chapter 1; this chapter has an expanded discussion on need to the extent permitted by law. Quantitative information on defense material requirements, inventories, production capacity, and projected material shortages is classified.
FK-20	4.0. The preferred alternative is operating L-Reactor with the direct discharge of cooling water and subsequent mitigation measures. DOE should identify these subsequent mitigation measures in the final statement.	The introduction to Chapter 4 has been modified to indicate the preferred cooling-water mitigation measure.
FK-21	4.1.1.5. <u>Cooling-water reservoir (186-Basin)</u> . Some substantiation of the statement that there is no evidence of detrimental impact from annual processing basin flushing should be presented. Although removal of sediment load from adjacent waters is a natural river swamp function, sediment loading, such as described in a massive flushing effort, could overload the system. Contribution to delta growth as predicted should not be considered as presenting no detrimental impact.	Flushing the sediment from the 186-Basin will only temporarily increase the suspended load in Steel Creek to levels similar to those experienced during periods of high runoff. As noted in Section 4.4.4, which discusses alternative methods of 186-Basin sludge removal, the total amount of sludge removed annually from the basin is about 110 tons. Flushed into Steel Creek, this sediment will not "overload the system," nor will it contribute appreciably to the delta growth.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FK-22	4.4.2.3. Some alternatives include alternative cooling-water systems that will be incorporated into L-Reactor operation after initial restart with direct discharge into Steel Creek. These alternatives should clearly identify the immediate and direct loss of 15 years of biological succession in the Steel Creek system as a significant impact.	Section 4.4.2 and Appendix I have been modified to indicate that implementation of cooling-water mitigation after the restart of L-Reactor will result in the loss of biological succession in the Steel Creek system.
FK-23	4.4.2.4. <u>Table 4-34 - Yearly operational and total costs for mitigation alternatives.</u> The restocking alternative should include costs associated with future studies needed to determine the success of the stocking effort.	The costs listed in Table 4-34 of the draft EIS provide a comparison between the three mitigation alternatives. The estimated 5-year cost for fishery research primarily included collection of data on selected anadromous fish species and support for development of sturgeon culture techniques. This research would be necessary to support a determination of the success of the restocking effort. Should the decisionmaker decide to adopt the restocking program as a mitigative measure, more detailed costs would be developed to assess the longer term success of the restocking program.
FK-24	4.5. If DOE considers the loss of 300 jobs as a factor in the evaluation of the no-action alternative, then consistency should be maintained throughout the document, and jobs created by the various alternatives (i.e., cooling tower construction) should also be included as factors in the evaluation of these alternatives.	Section 4.4.2 has been modified to provide an estimated maximum number of construction personnel associated with each cooling-water alternative.
FK-25	5.2.4.1. <u>Table 5-15 - Distribution of forested wetlands for the principal streams of the SRP.</u> Beaver Dam Creek should be included in this table. Since this section deals with incremental and cumulative impacts, another column breaking out forested wetlands that are still recovering from thermal impacts would be appropriate.	Table 5-15 of the Draft EIS presents the distribution of forested wetlands for the principal streams of the SRP. Beaver Dam Creek is a man-made canal, and thus is not considered to be a principal stream. Forested wetlands of the Steel Creek ecosystem that are recovering from thermal impacts are discussed in Section 3.6.1.2 and Appendix C of the EIS.
FK-26	6.1. The Mitigation Study initiated by DOE in agreement with the State of South Carolina warrants inclusion and discussion in this section.	The EIS has been modified to include provide a discussion of the thermal mitigation study in Section 6.1.4.
FK-27	8.0. It should be clearly stated that this section only addresses the base case alternative and the analyses contained in the subsections that follow would be significantly different for alternative actions.	Chapter 8 of the EIS has been modified to discuss unavoidable and irretrievable impacts of the reference case and the preferred alternative.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FK-28	8.1/8.2. Delta formation resulting from L-Reactor represents a permanent change in the nature of the wetlands in the Steel Creek system. By virtue of changing elevation and substrate, ecological succession on the delta after termination of L-Reactor operation will not necessarily proceed to a recovery community with the same characteristics or values that existed prior to this perturbation. In this regard, delta formation constitutes both an irreversible and irretrievable commitment of resources as well as a long-term impact that should be addressed under Section 8.1, and 8.2.	In 1951, prior to the establishment of the Savannah River Plant, the vegetation of the Steel Creek ecosystem (i.e., delta and swamp) was characterized by a closed canopy of mature cypress and tupelo (Sharitz et al., 1973). These flora were adversely impacted from 1954 to 1968 by the prior L-Reactor thermal discharge. Since 1968 when discharges from the L-Reactor terminated, the Steel Creek ecosystem has become revegetated through a process of natural vegetative succession. Structurally, the post-recovery vegetation is markedly different from the closed canopy of cypress and gum, and is characterized by scrub-shrub wetlands of willow and button bush. Some remnants of the original forest, however, are still present. Although the restart of L-Reactor without cooling-water mitigation would adversely impact the existing scrub/shrub wetlands, this would not constitute an irreversible or irretrievable commitment because these flora could become established again through the process of natural vegetative succession.
	<u>Summary</u>	
FK-29	The operation of the L-Reactor poses unclear risks to ground-water and the preferred alternative will have significant and unsatisfactory effects on fish and wildlife resources including their habitat. If DOE neither selects mechanical draft cooling towers nor develops a plan to adequately mitigate for impacts to fish and wildlife resources, then the Department of the Interior may choose to refer this project to the Council on Environmental Quality pursuant to 40 CFR 1504. We hope these comments will be helpful to you in the preparation of a final environmental impact statement. Sincerely, Bruce Blanchard, Director Environmental Project Review	As discussed in response to comment FK-1, in this final EIS the Department of Energy has identified a preferred cooling-water alternative; to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in the lake. In addition the Department will be working with the U.S. Fish and Wildlife Service in using HEP to identify and implement further habitat mitigation measures in conjunction with the preferred cooling-water mitigation alternative. Further, a separate NEPA review will be conducted on the SRP ground-water protection program.

M-559

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF JOHN C. VILLFORTH, DIRECTOR		
National Center for Devices and Radiological Health Food and Drug Administration Rockville, MD 20857 Mr. M. J. Sires, III Assistant Manager for Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office P. O. Box A Aiken, South Carolina 29801 Dear Mr. Sires: The National Center for Devices and Radiological Health Staff has reviewed the Draft Environmental Impact Statement (DEIS) related to the L-Reactor Operation at the Savannah River Plant, DOE/EIS-01080, dated September 1983. Our staff has evaluated the public health and safety impacts associated with the proposed restart of L-Reactor operations, and has the following comments to offer:		
FL-1	1. The design of the reactor systems and radiological waste management as described in Section 2.2.2.5 provide adequate assurance that radioactive materials in the effluent will be maintained as low as reasonable achievable (ALARA). It appears that the calculated dose to individuals and to the population from effluent releases from L-Reactor operations and from other nearby nuclear facilities is within current radiation protection standards.	Comments noted.
FL-2	2. The environmental pathways identified in Section 4.1.2 and depicted in Figure 4.6 cover all possible emission pathways that could impact on the populations in the environs of the facility. The dose computational methodology and assumptions (Appendix B) used in the estimation of radiation exposure to individuals and to populations within 80 km. of the Savannah River Plant have provided the means to make reasonable	Comments noted. The revised Summary in this EIS contains the cumulative total body doses from L-Reactor operations and other nearby facilities; however, these doses are contained in the narrative rather than in a table similar to that of Table 5-19 in the draft EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
estimates of the doses resulting from normal operation of the L-Reactor and its support facilities. Results of these calculations are shown in Appendix B, Tables B-7 through B-48. Summary of the dose commitments are shown in Figures 4-12, 4-13, 4-14, 4-17, 4-18, and 4-19 and Tables 5-11, 5-12, and 5-19. These results confirm that the calculated doses meet the radiological design objectives. We note that the Summary contains a Table S-1 which is a summary of the maximum individual and regional population total body doses from operation of the L-Reactor and SRP support facilities and is the same as Table 5-12. We believe it would be helpful to also include Table 5-19 in the Summary which contains the cumulative total body doses from L-Reactor operations and other nearby facilities. Inclusion of this table (as Table S-4) would provide the reader with the means to readily assess the additional impact of the L-Reactor operations as it relates to the cumulative impact on total-body individual and population doses from other nearby nuclear facilities.	3. Discussions in Section 4.2 and Appendix G on the environmental impact of postulated accidents are considered to be an adequate assessment of the radiation exposures and health impacts of atmospheric releases. It is noted in Appendix G.3.3 that an onsite Emergency Operations Center has been established and is maintained at SRP to provide immediate and informed response to mitigate the consequences of any site accidents. The presentation in Appendix H on offsite emergency planning is considered to (1) contain the essential elements for responding to emergency situations and (2) provide for notification and coordination with the South Carolina counties and the States of South Carolina and Georgia.	Comments noted.
FL-4	4. The radiological monitoring program as presented in Sections 6.1.1, 6.2.2, 6.2.3, and 6.2.4 appears to provide adequate sampling frequency in expected environmental exposure pathways. The analyses for specific radionuclides are considered sufficiently inclusive to (1) measure the extent of emissions from the Savannah River Plants, and (2) verify that such emissions meet the applicable radiation protection standards.	Comments noted.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
FL-5	We are pleased to note that DOE in July 1983 initiated a two-year program to determine the environmental effects and significance of cooling-water intake and discharge supporting operations of all SRP production reactors (C, K, L, and P) and the 400-D area coal fired plant. In particular, we are interested in the radionuclide remobilization, deposition, and effects and the radiation worker epidemiological studies. We would appreciate receiving copies of the study when they are available. Thank you for the opportunity to review and comment on this Draft Environmental Impact Statement. Sincerely yours, John C. Villforth Director National Center for Devices and Radiological Health	Copies of the study when it is available will be sent to your office.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF T. TRAVIS MEDLOCK		
Attorney General The State of South Carolina Columbia, South Carolina		
M. J. Sires, III Assistant Manager Health, Safety and Environment U.S. Department of Energy Savannah River Operations Office Post Office Box A Aiken, South Carolina 29801		
Dear Mr. Sires:		
This office has reviewed the Draft Environmental Impact Statement prepared for the restart of the L-Reactor, as well as the comments submitted by other government agencies, private groups and private citizens. Based on this review, I have concluded that I concur with the recommendations of the Environmental Protection Agency and others that the Draft EIS is unsatisfactory in its present form. My areas of concern relate primarily to the impacts of reactor operations on groundwater and on the waters of Steel Creek, and to the reactor's production of hazardous waste.		
In my opinion, the Draft EIS should be strengthened in the following areas:		
FM-1	1. The need to obtain an NPDES permit under § 402 of the Federal Clean Water Act needs to be given fuller treatment. The prior NPDES permit did not exempt onsite streams; it ignored the reactor's impacts on those streams. The DEIS also should mention that a federal regulation, 40 CFR 122.47 (a) (2), prohibits the development of delayed compliance schedules for recommencing discharges such as the L-Reactor. In view of these deficiencies, the statement on p. 7-7 that DOE anticipates receiving the permit by the end of the year presents an inaccurate picture of the prospects for a legal restart.	Section 4.4.2 of the EIS, which discusses cooling-water mitigation alternatives, has been revised based on public comments received on the draft EIS. Specifically, Section 4.4.2 has been revised to provide a detailed discussion of additional combinations of various cooling-water systems. In Section 4.4.2, each of the cooling-water mitigation systems is evaluated for attaining the thermal discharge limits of the State of South Carolina. Section 4.4.2 and a revised Appendix I, Floodplain/Wetland Assessment, discuss the wetland impacts of each of the systems considered.

M-563

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
2.	Full consideration of the prospect of the L-Reactor receiving an NPDES permit is necessary to place the restart on a realistic timeframe which if followed, would permit other mitigation activities. Since it does not appear possible that the reactor restart could occur as soon as the DEIS projects, the DEIS should give further attention to mitigation in other areas.	The Department of Energy has been reviewing and evaluating alternative cooling-water systems for L-Reactor. Based on these reviews and evaluations, and consultations with representatives of the State of South Carolina regarding a mutually agreed upon compliance approach, a preferred cooling-water mitigation alternative is identified in this EIS. This preferred cooling-water alternative is to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in the lake. The Record of Decision prepared by the Department on this EIS will state the cooling-water mitigation measures that will be taken which will allow L-Reactor operation to be in compliance with the conditions of an NPDES permit to be issued by the State of South Carolina.
3.	The discussion of cooling-water alternatives should fully relate each proposed alternative to State temperature standards for Class B streams. A comparison of each alternative with the State standards would appear necessary for the decisionmaker or the public to understand the effectiveness of the listed alternatives.	Several modifications have been made to this final EIS based on the comments received. In addition to the modifications to the discussion of cooling-water mitigation alternatives, this final EIS provides additional data concerning ground water as well as a description of the SRP ground-water programs in which the State of South Carolina is participating.
FM-2	4. With regard to groundwater contamination, a number of deficiencies have been noted in the comments of EPA and Dr. Sternberg, among others, which we adopt and incorporate by reference. In particular, while the DEIS mentions the 33% increase in effluent volume at the Fuel Fabrication and Chemical Processing Facilities, it should devote more attention to planned mitigation of the effects of present and future effluents. The restart should be more fully related to DOE's larger efforts to resolve groundwater problems at SRP. We would also note that Sen. Hollings, in sponsoring the bill which led to Congress' requiring an EIS, specifically suggested that groundwater mitigation options be covered in detail.	
These, in summary form, represent the comments of this office on the DEIS. We recommend that you give close consideration to the other comments submitted, especially those submitted by EPA and the various state agencies.		Please let me know what you plan to do with these and other comments submitted on the DEIS by State officials and others.

M-564

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
	Thank you for your consideration. Sincerely yours T. Travis Medlock Attorney General	
TTM:rmr		

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
STATEMENT OF V. I. MONTENYOHL		
January 30, 1984		
Mr. M. J. Sires, III U.S. Department of Energy Savannah River Operations Office P.O. Box A Aiken, S.C. 29802		
Dear Mel:		
First an apology. I looked over the various reports that you have sent me, but I haven't had time to write you comments until now. I'm sorry about the delay. However, I don't think a recital of all the things that kept me from writing until now would be helpful.		Comments noted.
First, a few comments about "Environmental Consequences of Restarting L-Reactor, Savannah River Plant, Aiken, S.C. - Volume 1 - August 1983:"		
1. The first item listed under each topic in Section 2 might better be labelled "Allegations," rather than "Statements and Comments." A casual or careless reader might mistakenly assume that the "Statements and Comments" had some official basis.		
2. In topic 2.5 "Ground Water," mention is made of the fact that new Type III storage tanks have not leaked. However, there is no mention of the solidification of the wastes in the older tanks; with the wastes solidified, the material does not leak from the tanks, even if a leak path should occur.		
3. In the same topic it wasn't made clear that the chlorinated solvents that leaked into the ground water were degreasing solvents from metal fabrication, and not associated with the processing of radioactive materials. The same risk of leakage of degreasing solvents probably occurs at hundreds (perhaps thousands) of places in the country where such solvents are used.		

M-566

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
4.	The topic 2.10 "Radiation Dose Calculations" contains the usual allegations about the impact of long-term exposure to low-level radiation. DOE might well point out that most of varies with altitude, the releases from SRP can be expressed as the equivalent in radioactive exposure to an increase in local altitude. I recall having the calculation made several years ago for tritium releases; in that case, the result of the cumulative releases was comparable to increasing the altitude of SRP and neighboring area about 7 inches. If you had the calculation made for all releases, my guess would be that the total impact would be comparable to an altitude increase of a few feet. Obviously, if your critics were sincere, they should immediately urge the evacuation of Colorado and New Mexico. They should also worry about the exposure of flight crews on most airlines.	My only other comments (which ties in with the other report you sent - "Draft Environmental Impact Statement, L-Reactor Operation, Savannah River Plant") is my concern over the acceptance by DOE of DHEC's point-of-origin monitoring. If this monitoring is done intelligently, it can be an advantage. However, if the matter is not handled with some skill, there is the risk of repeating the Vallecitos problem. You probably recall that GE used to have a power reactor test station at Vallecitos, California. The site was quite small. The state of California ruled that GE could not release any radioactivity beyond the site boundary. Now it happens that well water in the area has a small amount of natural radioactivity in it. As a consequence, GE could not pump water from its well and release it upon the ground, because it might run across the fence line and thus violate the control ruling, even though the water had never been in the reactor building. Ironically, the next-door neighbor could have a well that he used to water the lawn without being in violation of the regulation. Hence, one can't help who was being protected and from what by such a regulation. If the close-in monitoring is used simply to assure maximum sensitivity and to assure that no release of harmful proportions can reach the public, then it can be an advantage. However, if it is interpreted in such a fashion that the limit for the monitoring site become the same as the limit for general exposure of the public, then it may be impractical.

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
-------------------	----------	-----------

Thanks for sending the reports.

Sincerely,

V.L. Montenyohl
1050 Two Notch Road
Aiken, SC 29801

Table M-2. DOE responses to comments on Draft EIS (continued)

Comment number	Comments	Responses
----------------	----------	-----------

CENTRAL SAVANNAH RIVER AREA
REGIONAL CLEARINGHOUSE MEMORANDUM
A-95 REVIEW AND COMMENT

TO:

Mr. M. J. Sires
Dept. of Energy
Savannah River Operations Office
P.O. Box A
Aiken, SC 29801

FROM: Mark Senn
CSRA Planning and Development Commission

SUBJECT: RESULTS OF REGIONAL CLEARINGHOUSE REVIEW

Applicant: Department of Energy
Project: L-Reactor Operation - Aiken, S.C.
Clearinghouse Control Number: GA. 83-09-27-001

The Regional - level review of the above referenced project has been completed and the following comments made:

Comments noted.

 x This proposal is considered to be consistent with Regional and local plans, programs, and policies concerning such projects.

 This proposal is recommended for further development subject to the following recommendations.

 This proposal is not recommended for further development based on the following rationale.